DOCUMENT RESUME

ED 305 329 SP 030 956

AUTHOR Sarvimaki, Anneli
TITLE Knowledge in Interactive Practice Disciplines. An Analysis of Knowledge in Education and Health Care. Research Bulletin 68.
INSTITUTION Helsinki Univ. (Finland). Dept. of Education.
REPORT NO ISBN-951-45-4787-X
PUB DATE 88
NOTE 292p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC12 Plus Postage.
DESCRIPTORS *Educational Objectives; Educational Philosophy; Educational Practices; *Educational Principles; Health Promotion; *Interaction; Sociolinguistics; *Theory Practice Relationship; Values

ABSTRACT

This study formulates a conception of knowledge in interactive practice disciplines such as education and health care and clarifies different types of knowledge in these disciplines. Focus is on the relationship between practical and theoretical knowledge. Four theses are discussed: (1) the role of knowledge in an interactive practice is to guide practice; (2) different types of knowledge in an interactive practice consist of value-knowledge, factual knowledge and procedural knowledge, parts of which are unarticulated, parts articulated; (3) science is a way of articulating and creating knowledge that can be used as internal action determinants in the practice concerned; and (4) theories in an interactive practice can have both a theoretical and a practical purpose but the theoretical purpose is also indirectly linked to the practical. (Author/JD)

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RESEARCH BULLETIN 68

Anneli Sarvimäki

KNOWLEDGE IN INTERACTIVE PRACTICE DISCIPLINES

An analysis of knowledge in education and health care

SP 030 956

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RESEARCH BULLETIN 68

Anneli Sarvimäki

KNOWLEDGE IN INTERACTIVE PRACTICE DISCIPLINES

An analysis of knowledge in education and health care

Helsinki 1988

ISBN 951-45-4787-X
ISSN 0359-5749
VAPK Kampin VALTIMO
Helsinki 1988

University of Helsinki
Department of Education

Research Bulletin No.68, 1988

Anneli Sarvimäki
KNOWLEDGE IN INTERACTIVE PRACTICE DISCIPLINES. An analysis of knowledge in education and health care. Dissertation. 276pp.

ABSTRACT

The aim of the study is to formulate a conception of knowledge in interactive practice disciplines like education and health care and to elucidate different types of knowledge in these disciplines. Special attention is paid to the relationship between practical and theoretical knowledge. The study is theoretical and philosophical. It is based on a pragmatistically and constructivistically oriented conception of knowledge, where living, acting and knowingare the main concepts. Four theses make up the point of departure for the analysis: I. The role of knowledge in an interactive practice is to guide practice. II. Different types of knowledge in an interactive practice consist of value-knowledge, factual knowledge and procedural knowledge, parts of which are unarticulated, parts articulated. III. Science is a way of articulating and creating knowledge that can be used as internal action determinants in the practice concerned. IV. Theories in an interactive practice can have both a theoretical and a practical purpose but the theoretical purpose is also indirectly linked to the practical.

The first two theses are argued for and explained through an inquiry in the nature of practical knowledge in the interactive practices concerned. Practical knowledge is defined as knowledge manifested in appropriate action. Moral knowledge is seen as part of practical knowledge. Practical knowledge is organized in action schemata and implicit theories, which in turn organize the values, beliefs and abilities of the actor. The three epistemic styles empiricism, rationalism and metaphorism are used to describe how the beliefs are organized. Practical knowledge can also be collective. Tradition plays an important part in the mediation of practical knowledge. The last two theses are argued for and explained through an analysis of theoretical knowledge and of scientific knowledge as a special form of theoretical knowledge. Theoretical knowledge is characterized as a conception of the practice concerned and of how it is to be conducted. This knowledge too can be unarticulated or articulated. The aim of scientific activity in interactive practice disciplines is to formulate theories of and for practice, theories that can be used as theories in practice. The relationship between practical and scientific activity in the disciplines concerned is described as a common action system, the development of which can be conceived as a common learning process.

Key words: educational knowledge, health care knowledge, practical disciplines, moral practice, practical knowledge, theoretical knowledge.
ISBN 951-45-4787-X
ISSN 0359-5749

Available from: Department of Education
University of Helsinki
Bulevardi 18
SF-00120 Helsinki
Finland

Helsingfors universitet
Institutionen för pedagogik

Research Bulletin No.68, 1988

Anneli Sarvimäki
KUNSKAP I INTERAKTIVA PRAKTISKA DISCIPLINER. En analys av kunskap inom edukation och hälsovård. Doktorsavhandling. 276ss.

SAMMANFATTNING

Avsikten med undersökningen är att formulera en syn på kunskapens roll inom interaktiva, praktiska discipliner som edukation och hälsovård samt att klarlägga olika typer av kunskap som förekommer inom dylika discipliner. Speciellt avseende fästs vid relationen mellan praktisk och teoretisk kunskap. Undersökningen är teoretisk-filosofisk till sin natur. Analysen baserar sig på en pragmatistiskt-konstruktivistiskt influerad kunskapssyn, där grundbegreppen utgörs av liv, handling och kunskap. Fyra teser utgör utgångspunkt för analysen: I. Kunskapens roll i en interaktive verksamhet är att vägleda verksamheten. II. De olika typerna av kunskap i en interaktiv verksamhet utgörs av värdekunskap, faktakunskap och procedurkunskap, av vilka delar är oartikulerade, andra artikulerade. III. Vetenskapen är ett sätt att artikulera och skapa kunskap som kan användas som inre handlingsdeterminant i den aktuella verksamheten. IV. Teorier inom en interaktiv verksamhet kan ha både ett teoretiskt och ett praktiskt syfte men också det teoretiska är indirekt relaterat till det praktiska.

De två första teserna underbyggs genom en undersökning av den praktiska kunskapens natur inom de aktuella interaktiva verksamheterna. Praktisk kunskap definieras som kunskap manifesterad i lämpliga eller adekvata handlingar. Den moraliska kunskapen är en del av den praktiska. Den praktiska kunskapen är organiserad i handlingsschemata och implicita teorier, vilka i sin tur organiserar aktörens värden, föreställningar och förmågor. De tre epistemiska stilarna empirism, rationalism och metaforism används för att beskriva hur föreställningarna organiseras. Den praktiska kunskapen kan också vara kollektiv. Traditionen spelar en viktig roll vid förmedlingen av praktisk kunskap. De två sista teserna underbyggs genom en analys av den teoretiska kunskapen och av den vetenskapliga kunskapen som en speciell form av teoretisk kunskap. Teoretisk kunskap definieras som en uppfattning om den aktuella verksamheten och om hur den bör bedrivas. Också denna kunskap kan vara oartikulerad eller artikulerad. Målet för vetenskaplig verksamhet inom praktiska interaktiva discipliner är att formulera teorier om och för den praktiska verksamheten, vilka sedan kan användas som teorier i verksamheten. Förhållandet mellan praktisk och vetenskaplig verksamhet inom de aktuella disciplinerna beskrivs som ett gemensamt handlingssystem, där utveckling kan uppfattas som en gemensam inlärningsprocess.

Nyckelord: edukationskunskap, hälsovårdskunskap, praktiska discipliner, moralisk verksamhet, praktisk kunskap, teoretisk kunskap.

ISBN 951-45-4787-X
ISSN 0359-5749
Kan erhållas från: Institutionen för pedagogik
Helsingfors universitet
Bulevarden 18
SF-00120 Helsingfors, Finland

TO MY MOTHER

ACKNOWLEDGMENTS

I hereby wish to thank those who have supported me in my work on this study.

First of all, thanks are due to Professor Anna-Liisa Leino, Head of the Department of Education, for encouraging me and for facilitating my work in many ways. I also wish to thank Professor Leino for accepting my work for publication in the Department's Research Bulletin.

I am also deeply greatful to Professor Ingmar Pörn, who has been my philosophical counsellor for many years. He has read my manuscript and made me clarify my thoughts by asking crucial questions. He has also contributed to my definition of practical knowledge.

Professor Sirkka Hirsjärvi has given me good advice and has also examined my work. Ph.D. Singa Sandelin has also examined my work and she has contributed to my scientific development in previous discussions. Professor Erkki A. Niskanen and Professor Richard Rancourt have given me constructive comments and suggestions. I wish to thank them all.

I am also indebted to present and former colleagues and students at the Department of Education and the Department of General Practice, who have influenced my thinking through discussions on the topics here studied. My special thanks go to Bettina Stenbock-Hult, with whom I have had many and long discussions and who has had a decisive influence on my view of education and health care as well as of research.

I also want to thank Pearl Lönnfors for helping me with the language and Afiye Bavautdin for helping me with the practical printing arrangements.

For all the remaining weaknesses - linguistic as well as scientific - I am fully responsible myself.

I have received economic support from Svenska Kulturfonden (The Swedish Cultural Foundation), Svenska vetenskapliga centralrådet (The Swedish Central Board for Science), Sairaanhoitajien koulutussäätiö (The Educational Foundation for Nurses) and The Oskar Öflund Foundation.

Helsinki
October 1988

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1. INTRODUCTION

This study deals with knowledge in interactive practice disciplines like education and health care. The purpose is to clarify different types of knowledge that exist in these disciplines and to shed some light on the relationship between these types of knowledge. Special attention will be paid to the nature of practical knowledge and to the role of theories in the practices concerned.

1.1 Background

In her classical book Intention, G.E.M. Anscombe (1958, 57) says that in philosophy the main focus of interest has been on contemplative knowledge and that modern philosophy has misunderstood what ancient and medieval philosophers meant by practical knowledge. According to the contemplative view of knowledge, she says, knowledge is something that can be judged as being in accordance with facts. The facts constitute reality and determine what can be said, if we claim to have knowledge.

That Anscombe may be right can be seen by looking through different textbooks and studies of knowledge: they generally deal with scientific knowledge, propositional knowledge, perception, analytical knowledge and other kinds of knowledge that might be called speculative (see e.g. Ayer 1975 and 1976, Beardsley & Beardsley 1972, Ekman 1979, 132-145, and O'Connor & Carr 1982). The conception of knowledge that we often meet is the one that Niiniluoto (1980, 138) calls the classical concept of knowledge: "knowledge is a well justified true belief".

This preoccupation with contemplative, scientific and propositional knowledge can be viewed as one manifestation of

the theoretical and rational mode of thinking that has influenced our Western culture for such a long time. Since this mode of thinking can be said to have culminated in science and scientific thinking, and science has to do with knowledge, science has been equated with knowledge: since science produces knowledge expressed in propositional systems, knowledge is always expressed in propositional systems produced by science. This implication is, of course, false.

In many practice disciplines in recent years there has been a growing uneasiness with the contemplative conception of knowledge and, correspondingly, a growing interest in practical knowledge and other forms of knowledge like ethical knowledge, know-how and aesthetic knowledge (see e.g. Carper 1978, Brownhill 1983, Eisner 1985, Elbaz 1983, Johansson 1983, and Nyiri & Smith 1988). Also, the role of scientific knowledge in practice disciplines has been questioned. The view of science has largely been adopted from natural science and some writers thus feel that it is irrelevant to the practice disciplines they themselves represent (e.g. Hunt 1977, Munhall 1982, and Tom 1985).

In the discussion about the relationship between a practice and its related theory and research we can point out at least two themes. On the one hand, we can see that some writers pay attention to the discrepancy between the practice level and the theory and research levels. According to Schröck (1981a), for instance, nursing is in a state of crisis because of this discrepancy: the theoreticians and researchers answer questions that the practitioners have not asked, they answer other questions than those asked by the practitioners, the researchers and the practitioners ask the same questions but give different answers, or the researchers do answer the questions asked by the practitioners - after which the practitioners may go out and apply the answers at once, which is not necessarily what the researchers had

in mind. Munhall (1982) and Greenwood (1984) ascribe this discrepancy to the way in which nursing research has been developed: while nursing care is considered a humanistic endeavour, a practical activity in a social context and a series of unique events, nursing research has dealt with generalizations, statistical analysis and predictions. In the area of education Marton (1986) has pointed out that educational research also seems to have little relevance for educational practice.

In contrast to these somewhat sceptical attitudes towards the practical value and relevance of current research in these disciplines the discussion also reveals lines of thought according to which practice in these areas is developing towards a more scientific stage. Gage (1978, 15-20, 41) emphasizes that teaching, for example, is a practical art, but in order to develop, the practical art of teaching needs a scientific basis. Engeström (1983, 179-185) describes teaching in a historical perspective and claims that teaching has developed from the artisan's or trade stage through the technical and humanistic stage and is now entering the theoretical stage. In the theoretical stage the teacher teaches the students to think and to master practice by means of theory. The teacher is also theoretically conscious of his own teaching and the practice of teaching is based on holistic cooperation and on a combination of teaching practice, research and developmental work, says Engeström.

Those who criticize the current state of research and theory in education and nursing, for example, usually mean that the discrepancy between theory and practice need not be permanent and inevitable. Thus, Munhall (1982) and Greenwood (1984) propose a more phenomenological, hermeneutic, idiosyncratic and situational approach in nursing research as a solution to the practice-research problem. They are evidently not alone in this opinion: the interest in hermenautic, phenomenological and ethnographic - so-

called qualitative - methods has grown continually in nursing research during the eighties and can almost be considered the "normal paradigm" for the moment (see e.g. Chenitz & Swanson 1984, Dunlop 1986, Leininger ed. & auth. 1984, Leininger ed. 1985, Oiler 1982, Parse 1981 and Watson 1985). In educational research qualitative methods do not seem to be stressed so strongly as in nursing research for the moment. Rather, there seems to be a tendency towards diversification and differentiation of methods (see e.g. Cohen & Manion 1980, Hellgren 1982, Hirsjärvi & Hurme 1979, Huttunen 1984, Wilenius 1976 and 1979).

In Finland the discussion about the relevance of scientific, theoretical and other types of knowledge in education and health care also has to do with recent educational reforms. About 15 years ago teacher education acquired academic status. During the last 10 years many health care disciplines have developed in the same direction. This shift from a mainly practical orientation to a more academic and research based orientation is probably one of the reasons why there seems to be a need for re-evaluation of types of knowledge and of the role of theory and research in these areas: the whole question of how to integrate theory and research into a practical activity is problematic, and so is the question of how to combine theoretical knowledge with e.g. practical, experiential and personal knowledge. There may also have been fear of losing valuable types of knowledge, embedded in traditions and habits, with the new academic status. The academization of old trades and practices is a process that is still going on - newcomers in the academic world in Finland are e.g. the restaurant and provision services. It is still too early to say how these new disciplines will develop and what problems they will encounter.

This process of academization of trades and occupations has probably not been unique to our country. It is a change

that many occupations have gone through in different countries and at different stages of history. However, as was noted previously, it may be one factor contributing to the large interest in knowledge in practice disciplines. Lindholm (1985, 124-125) says that we need to take care of those types of knowledge that are threatened. If we consider e.g. intuition, personal experience, empathy and practical excellence as "threatened" types of knowledge, there actually seems to be a large interest in taking care of them for the moment (see e.g. Agan 1987, Benner 1984, Boud et al. 1985, Burnard 1987, Hult & Sarvimäki 1983, 1984a, and 1984b, Rew & Barrow 1987, Schön 1983, and Usher 1985).

These changes and developmental trends, and this re-orientation with respect to the conceptions of knowledge have lead us up to a point where new roads are opening up. The types of knowledge inherent in practical disciplines are utterly diverse and variant, and apparently can not be reduced to one form.

The growing interest in knowledge in practice disciplines indicates a need for a new conception of knowledge in these areas, as well as a need for a view of the nature and role of knowledge in these areas as a whole. There seems to be a need especially for a deeper understanding of the relationship between theoretical and practical knowledge, between theory and practice. A deeper understanding in this respect might help us see why it seems so difficult to unite theory and practice.

1.2 The aims and problems of the study

The general aim of this study is to formulate a view of knowledge in interactive practice disciplines. The aims can be specified in the following way:

1. to formulate a view of the role of knowledge in an interactive practice,
2. to investigate and clarify different types of knowledge in an interactive practice,
3. to investigate and formulate a conception of science in an interactive practice discipline,
4. to clarify the concept of theory in an interactive practice discipline and to investigate different types of theories.

In order to achieve these aims I will try to answer questions like:

- Which are the types of knowledge embedded in an interactive practice discipline?
- What is meant by practical knowledge and theoretical knowledge?
- How are the different types of knowledge in an interactive practice discipline related to each other?
- How is scientific knowledge to be understood in an interactive practice discipline?

In order to answer these questions, however, I will first have to try to answer questions like:

- How shall we understand knowledge in general?
- What is the relationship between knowledge and action?
- How is an interactive practice and an interactive practice discipline to be understood?

Since the last three problems can be considered primary to the previous ones, they will be dealt with first. After that the other problems will be investigated.

As was noted previously, the area of study consists of interactive practices and interactive practice disciplines.

Later in the study I will go deeper into what is meant by this. Some introductory remarks and restrictions may, however, be needed before that. By interactive practices I mean different kinds of practices where interaction with individuals and groups constitute a central element and where this interaction aims at doing something for the individuals or the groups concerned. Interactive practices are for instance education, social work, different types of health care, and service practices like waiting on customers in a restaurant, taxi driving, and guiding and informing tourists.

I will restrict the study to the practices of education and health care. One reason for this is that these constitute systematic and organized practices with both social and historical contexts. Another reason is that they have developed a considerable amount of knowledge through both tradition and research, which make them suitable for the purpose of this study. They have also developed systems for the education of practitioners, researchers and administrators of the practice. Still another reason is that both education and health care aim at doing something good for other people: to help someone learn something, to help someone recover from illness, to help someone to die peacefully etc. This gives the practices under study a certain degree of coherence, although the immediate goals of the practices may differ from each other.

There are other kinds of practices that involve human interaction, which I do not consider interactive practices in the same sense as the practices described above. Farming and fishing, for instance, may involve both interaction and cooperation, but since these practices aim at influencing processes and states in the environment rather than at developing personalities, interpersonal relations and human affairs, I do not include these in the category of interactive practices.

1.3 On the nature of the problems and the study

The problems of this study can be conceived as philosophical problems. This means that they cannot be solved by means of general empirical methods. Rather, the method used can also be classified as philosophical.

However, philosophy is not only one method but includes a variety of methods. Schröck (1981b) mentions e.g. systematic doubt, phenomenological description, formal logic and dialectic, while Gaut (1985) concentrates on concept analysis, and Ray (1985) focuses on the phenomenological method.

All these methods have a common feature: they deal with what Schröck (1981a) calls second-order questions. While first-order questions are empirical and can be answered by referring to observations gathered and organized by the scientific method, second-order questions cannot be answered in this way. Second-order questions are, according to Schröck, philosophical; they help us understand the knowledge we have gained through empirical research and they help us see the "inner logic" of our knowledge and action.

The idea of arranging different types of questions and research on different levels has previously been put forth by Hirsjärvi and Lindholm. Hirsjärvi (1977, 86) has developed a conception of educational research according to which we can distinguish between an action level, a research level and a conceptualizing (hahmottava) level. The action level refers to educational reality, while the research level refers to empirical research in education and the conceptualizing level refers to theoretical inquiry in education. Hirsjärvi emphasizes that in serious scientific work theoretical and empirical aspects are usually combined.

Lindholm (1980, 70-71) presents a hierarchy that includes science, metascience and philosophy. For him science con-

sists of different empirical sciences like physics, psychology and anthropology. Metascience is empirical inquiry in the sciences, which gives us history of science, sociology of science and psychology of science. Philosophy constitutes a level of its own, including ontology, axiology and epistemology.

Lines of thought that resemble these have also been put forth by Brante (1980) and by Hirsjärvi in two later articles (Hirsjärvi 1981b and 1982).

I shall here adopt Schröck's (1981a) idea of questions of different orders and integrate it with Hirsjärvi's (1977, 86) and Lindholm's (1980, 71) hierarchies (fig. 1.1).

D. PHILOSOPHY -of the sciences of interactive practices -of interactive practices	Philosophical questions Third-order questions about interactive practices and their sciences
C. METASCIENCE -sciences of the sciences of interactive practices	Metascientific questions Second-order questions (empirical and theoretical) about the sciences of interactive practices
B. SCIENCES -of interactive practices	Scientific questions Second-order questions (empirical and theoretical) about interactive practices
A. INTERACTIVE PRACTICES -education -health care, etc.	Practical questions First-order questions about interactive practices

Figure 1.1 Questions of different order with respect to interactive practices

Level A thus covers the actual interactive practices and their practical questions. These are questions about e.g. how to act and interact in specific situations and about how to organize the interactive systems in society in the best possible way. Level B, the scientific level, covers both theoretical and empirical questions about the interactive practices. These are questions about how to describe and explain the practices concerned and the answers presuppose both theoretical inquiries and empirical research. The metascientific level again, level C, includes scientific questions about the scientific activity on level B. Since the questions on level B and C are of the same kind - they only have different objects - I consider them questions of the same order. Level D, finally, is the philosophical level. On this level both the interactive practices, their sciences and metasceinces can be studied by asking questions that cannot be answered by referring to a course of action (level A) or to empirical facts in combination with theoretical concepts (level B and C).

This hierarchy gives us questions of three orders instead of two. The practical questions can be considered first-order questions, the scientific and metascientific questions second-order and the philosophical questions third-order questions.

This study deals with third-order questions, which means that the methods used can generally be classified as philosophical. When the philosophical questions concern the actual interactive practices we talk, for instance, about philosophy of education, nursing philosophy and philosophy of medical practice. When the questions concern the sciences of these practices we talk about the philosophy of educational science, the philosophy of health care sciences and so on. The philosophy of the interactive practices has strong connections with other domains of practical philo-

sophy, while the philosophy of the sciences of interactive practices is connected to other areas of philosophy of science (see also Hirsjärvi 1985, 15-28; Niiniluoto 1984, 210; Sarvimäki 1976, 3-5 and 1984, 4-51.

The problems of this study belong to both the philosophy of the practices concerned and the sciences of these practices. Actually, the line between these two areas of philosophy is often vague and many problems can be seen as belonging to both areas.

The task of philosophy with respect to the interactive practices and their sciences can be stated as follows:

- -to problematize and question values, beliefs, concepts and theories that we often consider self-evident,
- -to reveal, explicate, analyze and clarify values, beliefs and concepts that are prevalent but often unconscious,
- -to critisize illogical, unreasonable and corrupted forms of thought and to argue for alternatives, and
- -to formulate overall views and syntheses, so-called "philosophies" of interactive practices and their sciences; these syntheses are often normative, that is, they tell us how we should describe and conceive these practices and their sciences and they also implicate principles for practical activity and inquiry in these areas.

This view of the tasks of philosophy is a synthesis of viewpoints presented by, among others, Beardsley & Beardsley (1972, 9-11), Hirsjärvi (1985, 24-28), McClellan (1976, 2), and Niiniluoto (1980, 21-22) (see also Sarvimäki 1987a and 1988).

This study includes elements of different tasks. The general

idea is to problematize and analyze as well as to criticize, argue and formulate syntheses in order to fulfill the aims of the study. The possible syntheses, however, cannot be conceived as forming a total "philosophy" in the normative sense of the word.

The value of adopting a philosophical approach to the practices and sciences of education and health care can also be expressed in Russell's (1980, 93-94) words:

> "Philosophy is to be studied, not for the sake of any definite answers to its questions, since no definite answers can, as a rule, be known to be true, but rather for the sake of the questions themselves; because these questions enlarge our conception of what is possible, enrich our intellectual imagination, and diminish the dogmatic assurance which closes the mind against speculation;..."

1.4 Concluding comments

This study, then, can be considered as a journey into the landscape of knowledge. The point of departure consists of the problems listed on page 6. The possible answers are not to be understood as definite solutions to the problems. Rather, the function of the problems is to open up new views, roads and landscapes, and the answers are to be considered as temporary halting-places.

Since knowledge is the main theme of this inquiry, I will start out by studying some central lines of thought in the theory of knowledge. On the basis of this review I will formulate some theses that will constitute the basis for my argumentation. The literature on education and health care will not comprise a special review of literature. Rather it will be included when it is relevant for the topic discussed.

2. EPISTEMOLOGICAL BACKGROUND

Epistemology, or theory of knowledge, is one of the main areas within the discipline of philosophy. Accordingly, the literature on the subject is abundant. In educational literature too, a lot has been written on knowledge; this is probably because education has to do with learning and learning has to do with knowledge. Since the relationship between knowledge and health care is not so apparent and many-sided as the relationship between knowledge and education, literature on the subject is not so versatile and not so extensive.

2.1 Epistemological traditions in philosophy

Because of the amount of literature on knowledge in philosophy it is not an easy task to summarize the theories into a few, distinct traditions. One basic distinction that is usually made is the one between empiricism and rationalism (Beardsley & Beardsley 1972, 73, 77; Ekman 1979, 136; Hirsjärvi 1985, 60-63; O'Connor & Carr 1982, 8-10; Randall & Buchler 1971, 74-89; Scheffler 1965, 2-4). In addition to these two main traditions, pragmatism is often mentioned as an important theory of knowledge (e.g. O'Connor & Carr 1982, 24-25; Randall & Buchler 1971, 126-139; Scheffler 1965, 4-5). Types of knowledge that are less frequently mentioned and that are not always related to these previous distinctions are practical knowledge or knowing how and knowledge by acquaintance (O'Connor & Carr 1982, 61-62; Russell 1980, 25-32; Ryle 1976, 28-32). Metaphorism is sometimes mentioned (e.g. Bronowski 1979, 43-63) but does not usually appear in established textbooks on theory of knowledge.

As will be apparent in the treatment of the epistemilogical traditions, there is not only one problem of knowledge but

many. One problem has to do with the concept of knowledge: what is knowledge? Another one concerns the sources of knowledge and a third the justification of knowledge. Still another problem deals with what is called modes of knowing. These problems are of different relevance within the different epistemological theories and traditions, and I will deal with them accordingly, although maybe not in a very systematic manner.

In the following overview I will follow two themes: one is that of rationalism and empiricism, the other one concerns theoretical and practical knowledge.

2.1.1 Rationalism

As the word 'rationalism' indicates, the rationalistic tradition in epistemology emphasizes the role of ratio, or reason, in acquiring and justifying knowledge. Outstanding rationalists in the history of philosophy are for instance Plato (427-347 B.C.), Descartes (1596-1650) and Spinoza (1632-1677).

Plato distinguishes between 'episteme', which means knowledge, and 'doxa', which means opinion or belief. While knowledge always concerns something stable and unchanging, opinion and belief concern something that is uncertain and subject to change. Therefore, the object of knowledge is the world of ideas which can not be grasped by the senses. The empirical world around us, which we get in contact with through our sense organs, is only an object of opinion. (Furberg 1969, 63-64; Niiniluoto 1980, 39)

Therefore, Plato's theory of knowledge is closely connencted with his view of reality as divided into an empirical world and a world of ideas. It is also closely connected with his view on the human soul as possessing innate knowledge. Dia-

logues that are relevant for an understanding of Plato's conception of knowledge are especially "Phaedo" (Platon 1984a), "Meno" (Platon 1984b), "The Republic"(Platon 1984c), and "Theaetetos" (Platon 1985). In "Phaedo" Plato argues for the immortality of the soul and the world of ideas; it is on these two ideas that the conception of innate knowledge is founded. In "Meno" Socrates shows how an uneducated slave comes to understand a geometrical idea; this is again seen as support for the idea of innate knowledge - since the slave has never been taught geometry, his knowledge must be innate. In "The Republic" Plato further develops the conception of the ideal world and elaborates the difference between knowledge as access to the world of ideas and opinion as sense impressions of the empirical world. Finally, in "Theaetetos" Plato discusses knowledge as perception, as true belief, and as a well justified true belief, without arriving at any clear solution (see also Furberg 1969, 77-80).

Descartes, too,concluded that our sense impressions are uncertain and often deceitful. The only truths that we can be sure of are those that our reason immediately comprehends; intuition, then, is the criterion of knowledge. (Ekman 1979, 135-137; Hartnack 1958, 87-91; Hirsjärvi 1985, 61; Ketonen 1981, 11-13)

Spinoza's Ethics (Spinoza 1983) can also be conceived as a rationalistic endeavour. Mathematics and geometry were, according to Plato, the ideal sciences (Niiniluoto 1980, 39) and Spinoza develops his ethical theory using geometry as a model. He formulates axioms, definitions, postulates and proofs.

The main characteristics of rationalism can accordingly be summarized as follows:

- There are a prioric truths, i.e. truths that do not need empiric support.
- The a prioric truths are certain whilst sense impressions are not.

- Intuition and discursive thinking, i.e. argumentation and logic, are the main methods for justifying knowledge.
- Rationalistic knowledge often has a systematic character (e.g. Spinoza).

(Ekman 1979, 136-137; Hirsjärvi 1985, 61; O'Connor & Carr 1982, 8-10)

2.1.2 Empiricism

As opposed to rationalism, empiricism claims that all knowledge comes from the senses and that sense impressions and observations are the criteria of knowledge: in justifying knowledge we must appeal to experience. Important empiricists in the history of philosophy are for instance Locke (1632-1704), Hume (1711-1776), and Mill (1806-1873).

Niiniluoto (1980, 39, 42) points out that empiricist traits can be traced back to Aristotle (384-322 B.C.). Aristotle emphasized the role of experience more than his teacher Plato. However, it would be misleading, says Niiniluoto, to call him an empiricist, because he never really succeeded in analyzing the role of experience in science. It was not until the New Age that empiricism developed into a philosophical programme and that the conflict between rationalism and empiricism became apparent.

In An Essay concerning Human Understanding, published in 1690 Locke criticizes the view that knowledge may be innate. He claims that there can be no knowledge without experience. There are two kinds of ideas, according to Locke: ideas of sense impressions and ideas of reflexion. The ideas of sense impressions arise when the external world affect our sense organs and these ideas are then the object of reflexion. Hence, without sense impressions reflexion has nothing to work with and we can have no knowledge. (Ekman 1979, 138-139; Hartnack 1958, 104-106)

Several authors have discussed whether Locke's critique is to be considered as philosophical or psychological. Aspelin (1977), for instance, shows that Locke has a tendency to combine psychological and epistemological arguments. Wall (1977) claims that Locke treats the conception of innate knowledge as an empirical, psycho-genetic hypothesis about how we come to possess knowledge rather than as an epistemological thesis.

The psycho-genetic nature of Locke's argument renders his theory especially applicable to education. Locke developed his educational theory in Some Thoughts concerning Education. In this work Locke sees the child as a Tabula Rasa on which early experiences leave their mark:

> "The little, or almost insensible, impressions on our tender infancies, have very important and lasting consequences; and there it is, as in the fountains of some rivers, where a gentle application of the hand turns the flexible waters into channels, that make them take quite contrary courses; and by this little direction, given them at first, in the source, they receive different tendencies, and arrive at last at very remote and distant places." (Locke 1970, 135)

> "But having had here only some general views, in reference to the main end and aims in education, and those designed for a gentleman's son, whom, being then very little, I consider only as white paper, or wax, to be moulded and fashioned as one pleases;..." (Locke 1970, 152)

Hume's conception of knowledge can be found in A Treatise of Human Nature, from 1739, and in Enquiries concerning the Human Understanding, which was first published in 1748. Hume makes a distinction between propositions that express relations of ideas and propositions that express matters of facts. The propositions of mathematics and logic belong to the first class while propositions about the reality belong to the second class. In order to justify knowledge organized in the second type of propositions we must appeal to experience. This means, however, that it is very diffi-

cult to justify any empirical knowledge that goes beyond our immediate sense impressions. We cannot, for instance, know anything about the relationship between cause and effect, upon which our knowledge of reality should be founded. Neither can we have any perceptions of our Self or Soul. Hume's argument leads up to a sceptical attitude, but at the same time he points to the solution of the problem, a solution that was further developed by Kant. (Ekman 1979, 140-141; Hartnack 1958, 111-115; O'Connor & Carr 1982, 10-14)

Mill, appearing on the scene about one hundred years after Hume, can be seen as one of the philosophers that opened up the road for the positivistic tradition in science (Niiniluoto 1980, 45). In System of Logic Mill (1872) outlines a view of The Scientific Method that rests strongly on experimentation and experience and takes physics as its point of departure. In The Logic of the Moral Sciences, which is a reprint of one Book in System of Logic, Mill applies this argument to social sciences an psychology as follows:

> "All phenomena of society are phenomena of human nature, generated by the action of outward circumstances upon masses of human beings: and if, therefore, the phenomena of human thought, feeling, and action, are subject to fixed laws, the phenomena of society cannot but conform to fixed laws, the consequence of the preceding. There is, indeed, no hope that these laws, though our knowledge of them were as certain and as complete as it is in astronomy, would enable us to predict the history of society, like that of the celestial appearances, for thousands of years to come. But the difference of certainty is not in the laws themselves, it is in the data to which these laws are to be applied." (Mill 1987, 63)

The empiricist position can be summarized as follows:

- All knowledge of reality is a posterioric, i.e. it needs empirical support.
- Sense impressions are the sources of knowledge about reality.

- The method for justifying knowledge must rest on observations.

(Ekman 1979, 136; Hirsjärvi 1985, 60-61; O'Connor & Carr 1982, 8-10, 146)

A solution to the conflict between rationalism and empiricism was introduced by Kant (1724-1804). Since Kant also put forth interesting ideas on the relationship between the theoretical and the practical, I shall pick up this theme before we go to Kant's syntheses.

2.1.3 Theoretical and practical knowledge

It is not only the rationalism-empiricism theme that can be traced back to the early Greeks but also the theoretical-practical theme. As Hintikka has shown in a series of studies (Hintikka 1965, 1969 and 1974) the theoretical-practical theme was important in both Plato's and Aristotle's writings. In the 18th century Vico presented an interesting view of practical and social knowledge.

In his studies Hintikka (1965; 1969, 21-27, 59-74; 1974, 1-47, 80-81) points out the close relationship between theoretical and practical knowledge in Plato's and Aristotle's writings. According to him, this has to do with the teleological world view of the early Greeks and with their admiration of the knowledge that the craftsmen possessed. In their work the craftsmen produce or make something, i.e. they realize a goal. The knowledge they possess has been referred to as maker's knowledge, or, to use the Greek word, techne. This maker's knowledge was highly estimated by both Socrates and Plato. However, in order to make something, the craftsman needs to know what he is to make, he needs to define the product he is going to make. Here we can see, says Hintikka, the close relationship between theoretical and practical knowledge in Plato's epistemology: in the process of making a product,

the craftsman copies or reproduces an idea, which means that he must know the idea. The idea is at the same time the goal of the process. Plato's theory of ideas is then directly linked to his theory of practical knowledge as techne.

The Greek word for knowledge, episteme , refers to two types of knowledge, according to Hintikka (1965; 1974, 28-31): knowing that, or propositional knowledge, and knowing how, or skill. Techne presupposes both.

There also seems to be different kinds of practical knowledge. Firstly, there is a difference in the craftsman's and the artist's knowledge, as Hintikka (1969, 24-25) notices. The shoemaker, he says, has not invented the shoe, he only makes the shoe, following a model. The artist, on the other hand, does not reproduce a preconceived goal or model, he also invents the goals. This distinction has later been used by, among others, Collingwood (1960, 15-16, 128, 151) to explain the difference between technical and artistic activity: technical activity is making something according to a preconceived goal or model, artistic activity means creating something without any preconceived, fixed result.

Another distinction that Hintikka (1974, 47) notices is that between maker's knowledge and user's knowledge. While the shoemaker only makes the shoe, the person who has ordered the shoe must have knowledge about how the shoe is going to be used. Of these two types of practical knowledge Plato considers user's knowledge more valuable than maker's knowledge, says Hintikka.

User's, creator's and maker's knowledge, then, seem to be three different types of practical knowledge that form a hierarchy. Creator's knowledge and user's knowledge are higher in the hierarchy, since they invent and formulate

goals. Technical knowledge is lower, since technical activity only realizes the goals that have been invented and formulated by the previous types of knowledge. This idea has also been applied by Harrison (1978, 13, 136-143); he uses the terms designing, making and designing while making, where designing stands for designing the models and designing while making for creative activity.

Finally, Hintikka (1969, 59-74) also shows that Socrates and Plato conceived of virtue, or morality, arete , as knowledge, i.e. episteme . As Hintikka notices, Socrates' remark that "virtue is knowledge" has puzzled philosophers at different ages. It is however understandable, says Hintikka, in the same way as episteme in general. Virtue includes on one hand knowledge of what goals to pursue, i.e. knowledge of the good. On the other hand it includes knowing how, i.e. a set of skills or capacities. Hence, virtue as moral knowledge includes both theoretical and practical knowledge.

As a student of Plato's Aristotle (384-322 B.C.) inherited his fundamental concept of knowledge from Plato and Socrates. He further developed the idea of different kinds of knowledge and divided knowledge or science into three large groups: theoretical, practical, and productive. (Barnes 1982, 23-27; Joachim 1955, 1; Taylor 1971, 20-25)

Joachim (1955, 1) remarks that according to our modern view of science, only Aristotle's theoretical sciences would be called sciences. In viewing practice and arts as sciences Aristotle reveals his close kinship to Socrates and Plato.

The theoretical sciences are contemplative and guided by theoretical reason alone. In doing theoretical science man is only a spectator of what is, independent of his own will, goals etc. The theoretical sciences are divided into theology, physical sciences and mathematics. Within these areas man tries to understand the nature of things. He

tries to acquire knowledge of substances, attributes, causes and properties simply for the sake of understanding. (Joachim 1955, 2-12)

The division in practical and productive sciences grounded in action as doing, *praxis*, and action as making, *poiesis*. In *The Nikomachean Ethics* Aristotle (1967, 20; Joachim 1955, 19) makes a distinction between activity that has an aim outside itself and activity where the end lies in the activity itself; *poiesis* represents the first type, *praxis* the second. The practical sciences deal with *praxis*, the productive sciences with *poiesis*.

Both doing and making realize an ideal. In praxis the ideal lies in a certain kind of life and conduct, in the will and motives of the actor: living well, having a good will. Practical sciences are e.g. ethics and politics that pursue knowledge of the good - the good life, the good society, etc. (Joachim 1955, 12-18)

In *poiesis* the ideal lies in the result that is produced through the process. Only the result is important, not the craftsman or the way in which it is produced. Productive sciences are the different kinds of art and craft, as well as rhetoric. (Joachim 1955, 12-13)

The sciences can be pictured as a hierarchical classification system (fig. 2.1).

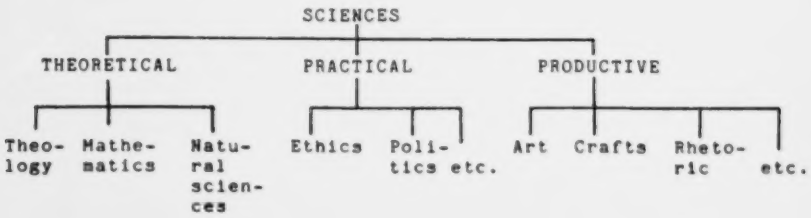


Figure 2.1 Aristotle's classification of sciences (modification of Barnes 1982, 27)

Aristotle makes the same distinction between maker's knowledge and user's knowledge as did Plato. The arts and practices are organized in a hierarchical structure so that some arts use the products that are results of other arts. Politics is according to him the highest art and education is the most important of those arts that serve politics: the statesman requires certain moral properties and character traits from the citizens and it is the educator's task to produce them. The knowledge inherent in the arts and crafts is the same episteme that Socrates and Plato defined as techne , a combination of knowing that and knowing how. So, for example, the art of healing is more or less identical with knowledge of what health is. An art or craft can also be put into rules and principles and in that way it can also be taught and learned. (Aristotle 1928, Book A, pass.1; Aristoteles 1967, 162-163; Hintikka 1965; Hintikka 1974, 37-38; Taylor 1971, 85)

Therefore, for the early Greeks practical and theoretical knowledge are closely interrelated. In many cases they seem to be one and the same thing. Aristotle, however, separates a special theoretical area, which, according to him, is entirely contemplative. This made possible the distinction between the conception of a life in action and a contemplative life - vita activa and vita contemplativa - that influenced many medieval theologians and philosophers (Taylor 1971, 92-93, see also Arendt 1958, 7-21).

The conception of real knowledge as maker's knowledge was also transmitted from the early Greeks to medieval philosophers, and from them further on to the natural scientists of the New Age. This line of influence is pointed out by Hintikka (1969, 19-34; 1974, 80-83). The conception of maker's knowledge is according to him an expression of the same idea as Bacon's "knowledge is power".

Hintikka (1969, 27) says however that there are certain differences between the medieval conception of maker's knowledge as true knowledge and Bacon's conception of knowledge: while the medieval philosophers saw maker's knowledge as a presupposition for theoretical knowledge, Bacon's view was more or less the opposite.

A somewhat later advocate of the conception of true knowledge as maker's knowledge is Giambattista Vico (1668-1744) who, according to Hintikka (1974, 81-83), claims that since man has made society but not nature, man can possess true knowledge only of society. Hintikka himself does not agree with this: according to modern judgment man seem to have much more maker's knowledge about nature and controls it more successfully than society and culture.

Vico's main work is The New Science, a science which, in accordance with his conception of knowledge, is a social science. Vico (1961) uses the term 'poetic wisdom' for maker's knowledge as it expresses itself in the making, or creating, of social institutions. The term 'poetic' originates from the Greek word 'poiesis', i.e. making, which points to the kinship with the early Greeks (Bergin & Fisch 1961, xlvi-xlvii). This poetic wisdom, consisting of both intellect and will, is inherent in mythology, language, metaphors and traditions; it is, in other words collective, belonging to whole groups of peoples (Vico 1961, 64-70). In the process of making the social institutions man has also created his own humanity. According to Vico (1961, Book Four) the making of society has progressed through different stages, from stages of religion and divinity to humanity and duty.

As we can see, the concept of practical knowledge, as well as the problem of the relationship between theoretical and practical knowledge, has a long history. And, as Hintikka (1974, 80) points out, a striking feature of this history

is that theoretical and practical knowledge are so inextricably intertwined.

We can now sum up the history so far as follows:

- There seems to be two separate types of knowledge, theoretical knowledge and practical knowledge.
- Theoretical knowledge has ususally been defined as 'knowing that', propositional knowledge, knowledge of definitions, or contemplative knowledge.
- Practical knowledge has usually been conceived as maker's knowledge, i.e. technical knowledge, and doer's knowledge (see e.g. Hintikka 1974, 80) or user's knowledge.
- Theoretical and practical knowledge seem to be in some way interrelated; the opinions differ, however, as to how they are interrelated.

An interesting contribution to the theory-practice theme was offered by Immanuel Kant. He also suggested a solution to the rationalism-empiricism problem.

2.1.4 Kant's syntheses

Kant (1724-1804) introduces the distinction between analytical and synthetical judgments in combination with a prioric and a posterioric knowledge as a solution to the epistemological problems of rationalism and empiricism. Kant presents his epistemological theory in Kritik der reinen Vernunft, published 1781. He begins by stating that all our knowledge begins with experience and goes on:

> "But, though all our knowledge begins with experience, it by no means follows, that all arises out of experience. For, on the contrary, it is quite possible that our empirical knowledge is a compound of that which we receive through impressions, and that which the faculty of cognition supplies from itself (sensuous impressions giving merely

> the occasion), an addition which we cannot distinguish from the original element given by sense, till long practice has made us attentive to, and skilful in separating it. It is, therefore, a question which requires close investigation, and is not to be answered at first sight - whether there exists a knowledge altogether independent of experience, and even of all sensuous impressions. Knowledge of this kind is called a priori, in contradistinction to empirical knowledge, which has its sources a posteriori, that is, in experience." (Kant 1984, 25)

> "By the term 'knowledge a priori,' therefore, we shall in the sequel understand, not such as is independent of this or that kind of experience, but such as is absolutely so of all experience. Opposed to this is empirical knowledge, or that which is possible only a posteriori, that is, through experience. Knowledge a priori is either pure or impure. Pure knowledge a priori is that with which no empirical element is mixed up. For example, the proposition, 'Every change has a cause,' is a proposition a priori, but impure, because change is a conception which can only be derived from experience." (Kant 1984, 26)

Kant (1984, 30-34) then combines his view of a prioric and a posterioric knowledge with analytical and synthetical judgments. An analytical judgment is one where the predicate belongs to the subject. In a synthetical judgment the predicate does not belong to the subject but adds something to it. The distinction between a prioric and a posterioric judgments is not synonymous with the distinction between analytical and synthetical judgments. All analytical judgments are a prioric but the synthetical judgments can, according to Kant, be either a prioric or a posterioric. The basic principles of science, like the category of cause and effect, are synthetical and a prioric, Kant claims.

Kant's argument has been called a transcendental argument. This means that in his attempt to achieve a compromise between rationalism and empiricism, he studies the presuppositions of knowledge. Synthetical a prioric knowledge is

then introduced as the presupposition of our empirical knowledge of the world. It determines how the human mind works when it is confronted with the empirical world. The analytical judgments, on the other hand, have nothing to do with the empirical world, they are purely "rational". (See also Ekman 1979, 143-145; Hartnack 1958, 117-123; Niiniluoto 1980, 144-146; O'Connor & Carr 1982, 145-149,159-161)

Kant's theory of knowledge is related to his view of reality. The synthetical, a prioric categories determine our knowledge of the empirical world, the world of phenomena. There is, however, another world, the world of noumena or things in themselves, of which we can have no experiential knowledge. This leads Kant to an idealistic view of reality. (Ekman 1979, 141-142; Kant 1984, 180-191)

The previously related theories of knowledge are also related to different kinds of theories of truth and views of reality (see e.g. Ekman 1979, 138-42; Niiniluoto 1980, 139-144; O'Connor & Carr 1982, 164-165). I will not go through these in the present chapter but touch on them later when I formulate the points of departure for this inquiry.

Kant's influence on later philosophy has been enormous. In addition to his influence on German idealism and hermeneutics, which is understandable, he has influenced pragmatic epistemologists as well as scientific realists.

One line of influence stems from Kant's recognition of the human mind as an active part in acquiring and creating knowledge. In close association with this idea is the conception that the active mind works according to some specific categories or presuppositions that influence the knowledge acquiring process. Later philosophers and scientists, however, hardly consider these categories a prioric and synthetic in the same way as Kant. Lorenz (1974), for

instance, considers them genetically inherited and specific for the human race; he calls them "the back of the mirror". Tuomela (1983, 35) again sees them as social and linguistic, and hence also as changing.

Another important source of influence stems from Kant's way of linking knowledge and morality. While Kant's theory of knowledge is found in his Kritik der reinen Vernunft, his theory of morality can be found in Grundlegung zur Metafysik der Sitten, published 1785, and Kritik der praktischen Vernunft, published 1788. According to Kant, man belongs to two worlds:

> "Therefore a rational being must regard himself qua intelligence (and hence not from the side of his lower powers) as belonging not to the world of senses but to the world of understanding. Therefore he has two standpoints from which he can regard himself and know laws of the use of his powers and hence of all his actions: first, insofar as he belongs to the world of sense subject to laws of nature (heteronomy); secondly, insofar as he belongs to the intelligible world subject to laws which, independent of nature, are not empirical but are founded only on reason.
>
> As a rational being and hence as belonging to the intelligible world, can man never think of the causality of his own will except under the idea of freedom; for independence from the determining causes of the world of sense (an independence which reason must always attribute to itself) is freedom. Now the idea of freedom is inseperably connected with the concept of autonomy, and this in turn with the universal principle of morality, which ideally is the ground of all actions of rational beings, just as natural law is the ground of all appearances." (Kant 1981, 53-54)

Then, while the pure reason deals with knowledge, practical reason deals with morality. Moral ideas are according to Kant for instance freedom, self, world, God, immortality. Of these we can have no experiential knowledge. Rather, they are to be conceived as regulative ideas,

which means that they influence our thinking. This again means that they influence our interpretations of reality. Thus man's knowledge of the world is influenced by both the categories of pure reason and the regulative ideas. (Hartnack 1958, 125-129; Kant 1981, 44-62; Thayer 1968, 37-42)

The laws of morality, expressed in the categorical imperative, are not the only principles guiding action, according to Kant (1981, 24-30). There are, he says, rules of skill, counsels of prudence and laws of morality. The first kind of imperatives are technical, i.e. belonging to art, the second kind is pragmatic, i.e. belonging to welfare, and the third is moral, i.e. belonging to free conduct as such. While the first two kinds of imperatives are hypothetical, the moral imperative is, says Kant, categorical; moral action is not justified by anything outside morality.

Kant's argumentation is very extensive and by no means always free from contradiction. It is difficult to do him - as well as the other philosophers - justice in a relatively brief account like this and my main idea has simply been to point out some central features that have influenced many philosophers and that will also have some bearing on my own points of departure. These features can be summarized as follows:

- The traditional conflict between rationalism and empiricism can be conceived as a question of different types of knowledge. In later philosophy these types have often been called formal knowledge or truth and empirical or material knowledge or truth (Kaila 1939; Niiniluoto 1980, 108-115).
- The human mind is active in the pursuit of knowledge.
- The activity of the mind in the knowledge acquiring process is influenced by some kind of "a pri-

oric" categories, regulative ideas or other presuppositions.

- The moral principles are of a higher order than the principles of skill and prudence; here we can see a parallel to Plato's and Aristotle's view of the relationship between maker's knowledge and user's knowledge.
- Moral reason is primary to theoretical reason, since as Hartnack (1958, 129) puts it, to Kant existence is fundamentally moral.

Some of the Kantian ideas have been picked up by pragmatism, which, in its own way, has carried them on.

2.1.5 Pragmatism

In his extensive account of pragmatism Thayer (1968, 3-8, 44-45, 64-65) points out the Kantian influence, although he also indicates that it is not very easy to trace the philosophical roots of the first pragmatists.

The first pragmatist that Thayer (1968, 68-71, 79-83, 120-132) recognizes is Peirce (1839-1914), who was influenced by both Aristotle and Kant. Peirce's pragmatism was initially a theory of meaning (see also Niiniluoto 1980, 49-50, 112), according to which meaning and truth are established by the scientific community, through experimentation, i.e. action, and consensus. Another important pragmatist discussed by Thayer (1968, 53, 71-73, 136-148) is James (1843-1916). James was more influenced by the empiristic tradition than Peirce. He viewed experience as a means for adaptation, ideas and beliefs as plans of action, and thoughts, concepts and theories as instruments for action. Truth, according to James, has a moral basis.

Dewey (1859-1952), Mead (1863-1931) and Lewis (1883-1964) are other American pragmatists that Thayer (1968) discusses, and among European philosophers he finds pragmatistic lines of thought in e.g. Schiller's, Wittgenstein's and Sorel's theories.

Pragmatists that have influenced my own way of thinking are Dewey, Lewis and Rescher. I will return to them later in my analysis of living, knowing and acting. However, I will also point out some of their central ideas in this chapter in order to give them an appropriate place in tradition.

Dewey's production is very extensive and diverse. He has written on epistemology, ethics, society, education and art, for example. Central concepts in his writings are experience, value, action and knowledge. On experience he says for instance:

> "The nature of experience is determined by essential conditions of life.
> /.../
> "The first great consideration is that life goes on in an environment; not merely in it but because of it, through interaction with it."
> (Dewey 1934, 13)

Thus, Dewey primarily sees man as a living being, interacting with the world. In his interaction with the world man confronts things, obstacles etc. which become meaningful and give rise to emotions and interests. Just as life is a continuous process, so is experiencing. Man proceeds from one interactive situation to another and his experiences in previous situations influence subsequent experiences. Interaction and continuity are the principles of experience. Growth, as an aim of education, is conceived as a continuous development of experience. In this process of living and interacting, knowledge is created and tested by its consequences. Knowledge is instrumental. (Dewey 1934, 35-45, 59, 104, 264; Dewey 1963, Ch.2 and 3)

Lewis (1971) explicitly links knowledge to action and evaluation:

> "Knowledge, action, and evaluation are essentially connected. The primary and pervasive significance of knowledge lies in its guidance of action: knowing is for the sake of doing. And action, obviously, is rooted in evaluation. For a being which did not assign comparative values, deliberate action would be pointless; and for one which did not know, it would be impossible. Conversely, only an active being could have knowledge, and only such a being could assign values to anything beyond his own feelings." (Lewis 1971, 3)

Lewis (1971) then goes on to analyze the relationship between knowledge, action and evaluation in terms of experience, meaning, beliefs and values.

In The Primacy of Practice, Rescher (1973, xii-xiv, 1-8, 22, 151-152) overtly declares his Kantian point of departure. This does not mean that he would accept all Kant's theories but rather that his own way of arguing has a "Kantian orientation" and a "Kantian flavor". Rescher means that our empirical knowledge rests on justified postulates of regulative import and that these are practical. He advocates a pragmatic validation of the criterion of truth but distinguishes between propositional pragmatism and criterial pragmatism. According to propositional pragmatism, a proposition is to be accepted, if its adoption leads to maximal success. Criterial pragmatism, on the other hand, asserts that a proposition is to be accepted, if it conforms to a criterion, the adoption of which as a principle of propositional acceptance is maximally success-promoting. Rescher sees himself as a criterial pragmatist, which means that the criteria for validating truth are such that the truths accepted will promote practical success. We could say that although science, for instance, does not always pursue what is applicable but rather "knowledge as such", Rescher (1973, Ch.

VII) talks about an extra-pragmatic dimension of human purpose - this knowledge, if applied in action, will lead to success, because the whole endeavour of science is determined by practical, regulative postulates. Rescher considers practical reason primary to theoretical. He says:

> "These considerations indicate that the ultimate metacriterial standard for weighing a criterion of truth-acceptance (in the factual area) is not cognitive at all, but rather affective, and the justificatory reasoning for the test-procedure of truth-determination represents in the final analysis an appeal not to knowledge, but to feeling. The affective dimension of pain, frustration of hope, disappointment of expectation - and their opposites - becomes the court appeal that stands in ultimate judgment of our procedures for deciding upon questions of factual truth and falsity. In the final analysis cognition is ancillary to practice and feeling becomes the arbiter of empirical knowledge." (Rescher 1973, 21)

Pragmatism exhibits features of both empiricism and Kantianism. The empiricist influence can be seen in the strong emphasis on experience and experimentation. The Kantian influence can be seen in the practical postulates that pragmatists often conceive of as presuppositions for experience. The main idea of pragmatism, says Thayer (1968, 6, 65), is not the emphasis on utility as a criterion of truth, but the total relationship between action, experience, meaning, and knowledge. This large approach to knowledge often also includes art as a way of expressing meaning, experience and knowledge. Dewey (1934, 83-84), for instance, says that a piece of art can be true or false, and he continues:"Science states meanings; art expresses them." He also conceives of art as criticism of life, and says that art is "more moral than moralities" (Dewey 1934, 346, 348). A similar conception of art is presented by Collingwood, when he says:

> "Art is knowledge; knowledge of the individual" (Collingwood 1960, 289)

> "Art is the community's medicine for the worst disease of mind, the corruption of consciousness." (Collingwood 1960, 336)

The pragmatic position can be summarized as follows:

- Knowledge is formed by experience judged on the basis of practice.
- The a prioric presuppositions for our knowledge of the world are practical.
- A conception of man as an acting, interacting, feeling and valuing being is primary to a conception of human knowledge.
- Knowledge is a concern not only for science but also for art, morals and society.

The review of central themes in the area of knowledge has now led us to a point where knowledge is related in a fundamental way to man as a social actor. This relationship has been further investigated on the one hand by Habermas, on the other hand by social reconstructionists like Bernstein.

2.1.6 Habermas and social knowledge

One of the points of departure in Jürgen Habermas' theory of knowledge is his critique of the relationship between current social theory and practice.

In order to clarify his argument Habermas (1974, 1-40) goes back to Aristotle's distinction between theoretical and practical sciences, and between techne and praxis. Habermas claims that there is a gap between theory and praxis. Bernstein (1979, 175-178) means that according to Aristotle the contemplative life, bios theoreticos, had actually a practical aim: through contemplation the philosophers would develop their intellectual capacity and finally acquire wisdom; this wisdom would then guide them in their practical

affairs. This faith in speculative theory is according to Habermas a mistake - a mistake that has been made throughout Western philosophical and social thought.

Habermas (1966; 1974, 1-40) then develops his theory of knowledge interests. These knowledge interests have, according to him, an a prioric status: they "determine the aspect under which reality is objectified (Habermas 1974, 9)". The knowledge interests are the technical, the practical and the emancipatory interest. The technical interest is the interest that guides goal-directed, instrumental action. In this type of action, objects are experienced as capable of being manipulated. In addition to this type of objects man, in his dealings with the world, also confronts acting subjects who can be understood symbolically. In his interaction with other subjects, man is guided by a practical interest: mutual understanding, coordination of goals and action. There is, however, a third interest that transcends the technical and the practical interest. This is the emancipatory interest that guides man to revealing distorted forms of communication and to self understanding. According to Habermas different sciences are - or should be- guided by different interests. Thus, the natural sciences are determined by the technical interest while the humanistic sciences are determined by the practical interest. The social sciences, says Habermas, should be guided by the emancipatory interest. The problem is, however, that they are determined by a technical interest. This has distorted the relationship between theory and practice in the social area; instead of serving an emancipatory dialogue, social theories are applied in goal-directed, technical and startegical action.

Later Habermas extended his theory into a general theory of action, distinguishing mainly between action oriented to success and action oriented to reaching understanding (Ha-

bermas 1981, 384-387).

Habermas has had a vast influence on social philosophers as well as researchers in various areas of social and behavioural studies. Bernstein (1979, 219-225) recognizes Habermas' importance but he also points to some difficulties in his theories. For instance, he says, Habermas has not succeeded in clarifying exactly the epistemological role of the knowledge-constitutive interests - which must be considered a weakness as they play such an important role in his theory. Bernstein suggests that Habermas' difficulties may be due to the fact that his ambitions are too high.

The study of theoretical and practical knowledge in the thinking of some philosophical trends has now led us up to a conception of practical knowledge as, on the one hand, technical, i.e. instrumental and strategic, knowledge, and on the other hand, communicative and emancipatory action. Which, in a way, leads us back to Aristotle again. What can be considered as new, however, is of course the view of nature inherent in the modern natural sciences. Another new aspect is the view of society. On the whole, Habermas' analyses of knowledge has brought a strong social dimension to the conception of practical knowledge. There are in the social sciences recent theories that also strongly emphasize the social dimension. One of these is the so called theory of reconstructive knowledge, advocated for instance by Raskin and Bernstein (1987). The reconstructionists view the acquiring and creating of knowledge as a social process, based on moral conceptions (e.g. Raskin 1987, 19-36). In Finland Koskiaho (1986, 11-21, 205, 220-240) has adopted the concept of everyday or daily life knowledge to refer to a type of knowledge that grows out of the shared history, experiences and trials of a social community; she advocates a "citizens' society", where knowledge streams from "the bottom to the top", instead of the expert's society,

where the citizens are ruled by the knowledge of the experts. Still another recent theory that has developed the pragmatists' and Habermas' ideas further, is the theory of action science, developed by Argyris, Schön, Putnam and Smith (Argyris & Schön 1974; Argyris & Putnam & Smith 1985). The aim of action science, according to Argyris, Putnam and Smith (1985, 2, 6, 36, 45-54, 69-79), is to create knowledge that can inform action. This knowledge, they say, should not consist only of knowledge of which means lead to which ends. It should be critical knowledge that also includes moral aspects, knowledge that "engage human agents in public self-reflection in order to transform the world (Argyris & Putnam & Smith 1985, 6)". Another interesting theory of practical and theoretical knowledge is presented by Bourdieu. He analyzes social and cultural practices, which, according to him, tend to reproduce themselves through durable generative principles called habitus; habitus is a lasting disposition that integrates past experiences and at every moment functions as a matrix of perceptions, appreciations and actions (Bourdieu 1985, 78-87). The social practices pursue objective interests, and according to Bourdieu we can have three types of theoretical knowledge of the social world: familiarity (primary knowledge that is tacit, practical and not reflective), phenomenological knowledge (makes explicit the primary experiences of the social world), and objective knowledge (construction of objective relations which structure practice and representations of practice) (Bourdieu 1985, 3). Bourdieu's theory has some resemblance with Polanyi's theory. Polanyi (1958, 49-54, Part Two) describes knowledge in terms of skills, traditions and tacit components; he also stresses the personal, active dimensions in the process of acquiring knowledge.

2.1.7 Concluding comments

With this review I have tried to bring out a certain line of

thought. According to this line of thought all human knowledge rests on some kind of a prioric elements. These elements need not be transcendental - rather, they have to do with man as a living, valuing and sensing actor in a bio-physical and socio-cultural context. The relationship between theory and practice then becomes twofold. On the one hand, practice constitutes the a priori of knowledge. On the other hand practice is - directly or indirectly - the aim of knowledge.

Another point that I have wanted to make is that there are different types of knowledge - knowledge is not one thing but many. Firstly, knowledge is organized and transmitted in many ways, in science, in art, in practice. Different types of knowledge are, for instance, theoretical knowledge or 'knowing that', practical knowledge or 'knowing how', which may include technical as well as praxis-knowledge and emancipatory knowledge. Also, we can talk of knowledge by familiarity or acquaintance, tacit knowledge that is not formulated into words, articulated knowledge that may be phenomenological or objective, formal and empirical knowledge.

The philosophers that were chosen for the review, were chosen in order to illuminate these points. This means that many theories have been omitted; my ambition has not been to give a complete view of the history of epistemology. There are also differences between many of the theories chosen that have not been treated very much here.

2.2 The epistemological point of departure in this study

In the following I will outline the view of knowledge that will serve as the point of departure for the analysis of knowledge in an interactive practice discipline. This view can be considered as a continuation of the line of thought presented in the previous section, but now I will go into

some of the concepts and ideas in more detail. The problems I will deal with are two of those that were previously (p. 6) presented as primary to the main problems of the study, namely:

- How shall we understand knowledge in general?
- Which is the relationship between knowledge and action?

In the view outlined here knowledge will be conceptualized in the context of living, valuing, and acting.

2.2.1 Living

In his analysis of practical arts Mill (1872, 547-553) sees the art of life as the fundamental art, which includes all other arts. Although the conception of knowledge and action adopted in this work is not in all respects the same as Mill's, his view of the relationship between the art of life and other arts can be useful for illuminating some points concerning education and health care. According to this view the art of healing and caring, as well as the art of teaching and educating are subordinate to the art of living. As I see it, subordination does not mean that the arts of healing, caring and education are technical with respect to living. At least, this is not the only possible interpretation. Subordination also includes the idea that healing, caring and educating are parts of life, leavened with the same principles as life. Health care and education can be viewed as forms of life. I will explain this idea later.

In this work I will conceptualize life in the following way: Life is participating in a continuous creating process. Martin Heidegger, Ludwig Binswanger, Henri Bergson, Lewis Mumford and Jean-Paul Sartre have put forth thoughts along the same lines as I will here.

Heidegger (1981, 78-107) calls man's existence 'Being-in-the-World'. Constituent for 'Being-in-the-World' is care or concern (Sorge), which means being concerned, caring about and taking care of things. Concern has a positive and a negative modus, the positive meaning to act for or on the behalf of something and the negative meaning to act against something or being indifferent.

I shall interpret Heidegger's view in the following way: Man and the world are inextricably intertwined with one another. Man lives in the world, he is always related to it in one way or another. Even the attitude of indifference is a way of relating to the world. Thus, the value aspect is fundamental to man's existence. This interpretation means that I also see the attitude of indifference as valuational: the concept of indifference logically presupposes value concepts. Kant's view that man's existence is primarily moral (see p. 30) is also close to this view, although the valuational aspect as such does not necessarily mean that the values must be moral.

Living as participating then means that man is an integral part of the rest of the world. There is a continuous interaction between man and the world, an interaction that could be described as co-action: man and the world live a common life and act together. The value aspect describes the way in which man relates to the world, in which value modus he exists. The action terms describe in which way man and the world influence each other, how man participates in his common life with the world. In his action, interaction and co-action with the world man also gains experiences of the world and of himself. He gets to know the world and this knowledge guides his further action, as also Dewey expressed the matter (see p. 31). Dewey says:

> "But the process of living is continuous; it possesses continuity because it is an everlasting renewed process of acting upon the environment and

> being acted upon by it, together with institution of relations between what is done and what is undergone. Hence experience is necessarily cumulative and its subject matter gains expressiveness because of cumulative continuity. The world we have experienced becomes an integral part of the self that acts and is acted upon in further experience. In their physical occurence, things and events experienced pass and are gone. But something of their meaning and value is retained as an integral part of the self. Through habits formed in intercourse with the world, we also in-habit the world. It becomes a home and a home is part of our every experience."(Dewey 1934, 104)

There is, then, a continuous interplay between action, values and knowledge in man's intercourse with the world: on the one hand knowledge and values are formed in and through this process, on the other hand they influence the process.

This also brings out the creative dimension in living: in the process of living man continuously creates himself as well as the world, knowledge as well as values. This can be described by using Popper's idea of man living in three worlds.

World 1 according to Popper is the organic and material world. It is the world of physical objects and living organisms. World 2 is the world of subjective experiences. It is made up of sentience (e.g. animal consciousness) and consciousness (especially human consciousness of self and death). World 3, finally, consists of products of the human mind: art, science, technology, human language, theories of self and death. There is a continuous interaction between the three world, an interaction that also forms an interrelated control system. World 3, for instance, which is a product of or an objectivation of the human mind, has become a new system that controls human life. (Popper 1977, 16, 38-50; Popper 1982, 180-193)

An idea resembling Popper's has been presented by Binswang-

er (1958a, 270-292; 1958b; 1962, 65-67, 440-445). He uses the terms 'Umwelt', 'Mitwelt' and 'Eigenwelt'. Umwelt is the world of nature, biology, and natural laws; man's body, for example, is part of Umwelt. Mitwelt is the social and cultural world, where man lives with other men. Eigenwelt, finally, is man's "own" world, a subjective world where he experiences himself as a conscious, free, and responsible being.

Roughly, then, Binswanger's 'Umwelt' corresponds to Popper's 'World 1', 'Mitwelt' to 'World 3', and 'Eigenwelt' to 'World 2'.

Creativity can be seen as a characteristic of man's life in all three worlds. Biological life, for example, has been described as a creative process by, among others, Bateson (1973;1980), Dubos (1972), Eccles & Robinson (1984), Mumford (1970, 27-28) and Sinnott (1982). Biological creativity manifests itself in, for example, new species and new individuals. Creativity in World 2 or Eigenwelt means that every person is continuously engaged in the process of creating himself. This idea has previously been expressed by, for instance Bergson (1911, 11-13, 30-31; 1946, 91-95) and Sartre (1957, Ch.1). Creativity in World 3 or Mitwelt means that man is also continuosly creating a socio-cultural world, with art, science, values, social institutions etc.

Hence living means participating in a continuous, creative process. This process, since it is creative, has no fixed end. It is a manifestation of creative rationality, which means that it can be seen as a process of choices, where every choice influences the next but where the goal is open, although the process has a direction (see e.g. Collingwood 1960, 118, 128; Harrison 1978, 35, 66, 122-123; Pye 1968, 21-22; Sarvimäki 1986b, 114-119). Since man is participating in the creation of the world and of himself, he also becomes responsible for both the world and

himself - this has especially been stressed by Sartre (1957, 16-18; 1986, 35-40). In this respect we may agree with Kant: since living means participating in a common world and a common life process, and since participating implies responsibility, existence is essentially moral.

2.2.2 Acting

It is through action that man actually participates in the creation of the world.

Much of contemporary action theory goes back to Aristotle and his so called practical syllogisms (e.g. Aristoteles 1967, 187-192). G.H. v.Wright, for instance, has analyzed Aristotle's practical syllogisms and used them as a means for action explanations in many books and articles. According to v.Wright (1963, 35-41; 1971, 86-90), an act is something that an agent does and that is related to changes in the world. Through his action man interferes with the world; he choses to do something or not to do something and by that he prevents and produces changes in the world. Moreover, an act has an inner as well as an outer aspect. The inner aspect, according to v.Wright, is the intention of the act which is the way we describe the act. The outer aspect are the processes and activities (e.g. muscular activities) by which the act is carried out. An act can also be described in terms of results and consequences. The result, says v.Wright, is that which is achieved by the act; it is logically connected to the act. According to the practical syllogism that v.Wright (1971, 96-106; 1977) uses to analyze action an act or a decision to act is based on (at least) two premises: an end-premise and a means-premise. In some cases the syllogism consists of a rule- or norm-premise and specific act-premise (see also Thornton 1982). However, in most of v.Wright's own examples the means-end syllogism is used.

V.Wright's description of action in terms of means and ends, results and consequences, makes his theory applicable to the type of action that has been called technical, instrumental or success-oriented (see p. 22-23, 35-36). This is also indicated by the examples he uses: opening a window, making a house habitable etc. (v.Wright 1971, 88; 1977; 1978). Examples of social interaction are scarce. Since this study is dealing with interactive practices, a technical, means-ends view cannot suffice. The norm- or rule-following syllogism is also insufficient: it does not allow for the creation of new norms and rules through what Aristotle calls '<u>praxis</u>' and Habermas 'communicative action'.

Raimo Tuomela (1983, 72-91) has elaborated the terminology to fit social action. According to this view a result can be produced in three ways in social action: causally, conceptually and through representation. When a group of people are carrying a table upstairs, they are producing a result causally; when two people greet each other by saying "Hello" they produce a result conceptually. In the latter case the act is a social act of greeting and the result is the two "Hellos". Social action is also in Tuomela's theory characterized by a We-intention: the actors pursue a common result.

Tuomela's theory suits the purpose of this study better. However, although it is a theory of social action, it does not actually account for social interaction; it is more concerned with co-action.

Theories of interaction have been presented by, among others, Lennart Nordenfelt and Ingmar Pörn. Nordenfelt (1977a,68-80; 1977b) analyzes what he calls interactive episodes and studies how the influence of one agent over another can be described. He describes both agents in terms of practical syllogisms and describes the influence as an influence over

another agent's action premises. Pörn (1977) too sees social interaction as two or more agents influencing each other in different ways.

Since the object of this study is knowledge in interactive practices, Nordenfelt's, Pörn's, and Tuomela's theories seem more appropriate than v.Wright's. These theories do not necessarily exclude v.Wright's analyses. Rather, they extend them to the sphere of social interaction and co-action.

In the preceding section man was described as living in various worlds. Since man lives in these various worlds at the same time, his action can also be described in various terms at the same time. In most practices man combines the bio-physical, the socio-cultural and the subjective world. Practices like fishing and farming, for instance, are in a way directed towards the bio-physical world. They are instrumental in Habermas' sense of the word. However, as food producing practices they are also part of a social system and usually they also include social interaction and co-action. And the individual actors participate in the action from the standpoint of their subjective consciousness. Health care again which is primarily social interaction belonging to Mitwelt, also includes acts directed towards biological processes, i.e. to Umwelt, and is thus also instrumental. The nature of action in the interactive practices concerned in this study are hence quite complicated and I will return to this problem later. In this chapter I will only outline some general frames of reference concerning action.

In this study I will use as a general frame of reference an action model presented by Pörn. Since this model can be considered as rather general, it can be applied to different kinds of action and practices.

According to Pörn's (1981; 1984a) model, action can be de-

scribed as a system specified by four variables. If the action system is described in a time sequence, these four variables can be distinguished as phases of the activity: inquiry, decision, implementation, and change (fig. 2.2).

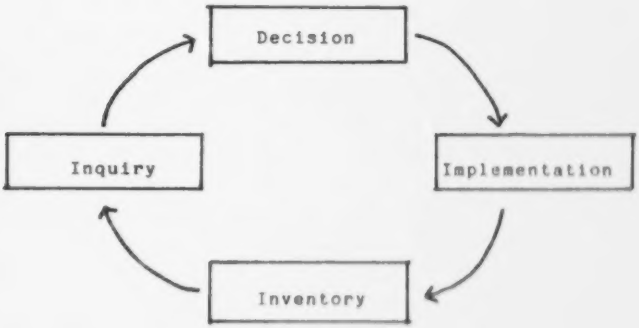


Figure 2.2 Pörn's action model

Pörn (1981) clarifies the model with the following example: A man maintains a wine cellar, which at a certain time consists of a certain number of wine bottles (inventory). By counting the bottles (inquiry) the man gets information (right or wrong) about the inventory. If the information he gets shows a discrepancy between the actual and the ideal inventory, the man will make a decision to order more wine. He then implements his decision, calls the wine merchant, and as a consequence, there is a change in the number of bottles so that the actual inventory amounts to the ideal.

In addition to these four state-variables or phases the system includes three factors that, according to Pörn (1984a) do not belong to the control loop but influence it from outside. Pörn calls these determinants. The first determinant is the ideal state of the inventory, which is

called want or volition. The second determinant is the action repertoire, that is, the agent's intrapersonal abilities to act. The third determinant is the epistemic frame. While volition influences decision and the repertoire influences implementation, the epistemic frame, according to Pörn, influences the inquiry phase. It consists, he says, of a class of possible models of the inventory, of which the agent accepts one.

This action model does not presuppose action always being successful. As was noted above, the agent may have a distorted picture of the actual inventory. He may also lack the abilities needed for the act, or he may suffer from "weakness of the will". Or, finally, the environment may not provide the agent with the opportunity to act. The model also allows for the case of an agent deciding not to act. (Pörn 1981 and 1984)

I will use Pörn's model with some modifications. Firstly, I will distinguish between internal and external action determinants. Internal action determinants are the ones that Pörn calls intrapersonal, while the external ones belong to the environment and the situation. By environment I mean relatively constant bio-physical and socio-cultural factors outside the action system. By action situation I mean continually changing action conditions. The concept of action situation roughly corresponds to v.Wright's (1963, 37) concept of occasion; an occasion may or may not provide an opportunity to act.

The internal action determinants I will call axiological orientation, epistemic orientation and ability. By axiological orientation I mean all aspects of an actor's value system: ideals, values, etc. By epistemic orientation I refer to an actor's system of beliefs. I have chosen the term ability instead of Pörn's repertoire, and I use the term in the same sense as v.Wright (1963, 48-51). An actor who has the ability to do a certain act can do it, or knows

how to do it. This again means that on most occasions, when he tries to do the act, he will succeed. An ability presupposes mastership of one or several techniques, i.e. skills. An actor may also have what v.Wright calls 'second order abilities'; these are abilities that he does not actually possess but that he is able to acquire. An actor's second order abilities constitute his capacity. Since v.Wright's definitions of ability, skill and capacity makes 'ability' a key concept to the other two, I chose to use this concept as the main concept.

As I see it, all action determinants influence all the phases of the action sequence. We can then add the internal and external action determinants to the action model as an internal and external "steering mechanism" (fig. 2.3).

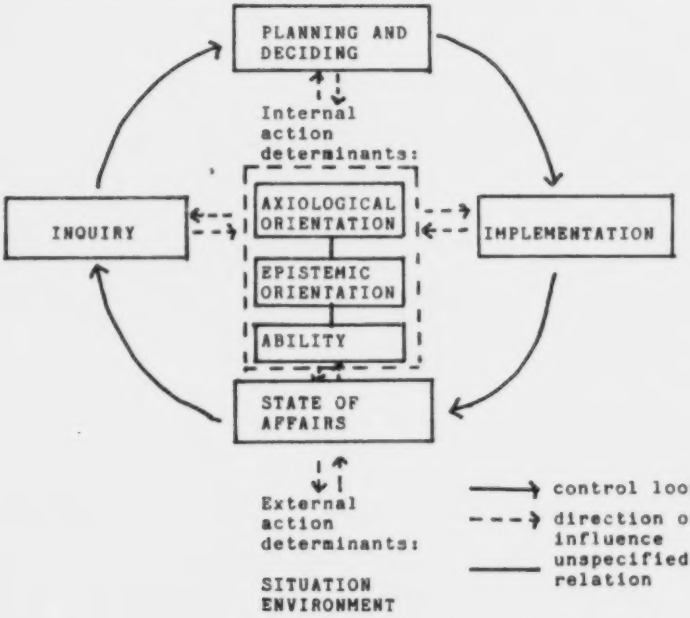


Figure 2.3 The action sequence and action determinants

A few changes have been made in this figure compared to the previous one (fig. 2.2, p. 46). To the decision-phase I have added planning, since most decisions are preceded by some kind of mental activity, conscious or unconscious, more or less profound. I have substituted 'state of affairs' for 'inventory', since it is a more general term. I assume that some kind of relationship exists between the internal determinants, but I have not specified the nature of this relationship. Furthermore, the influence between the internal action determinants and the action sequence is mutual, meaning that in and through action the actor's values and ideals, beliefs, skills and abilities are modified. This is another way of expressing what Dewey said when he described man as proceeding from one interaction situation to another, gaining experience that influences his action in the next situation (p. 31).

The action model presented here bears some resemblance to Royce's & Powell's (1983, 13) model of integrated personality that will be treated later in this study.

The process of living then proceeds in action sequences of the kind described above, or as Pörn (1981, 199) puts it: "In such circles we spend our lives."

2.2.3 Knowing

The view of knowledge advocated in this work could be called an interactionist -constructivist view, implying that knowledge is something that man creates or constructs in his interaction with the worlds in which he lives.

The interactionist aspect has strongly been emphasized by Dewey, and also Kant, which has been pointed out previously in this study (p. 27, 29, 31). Constructivism is a large conception that does not include only a view of knowledge but also a view of values and reality. The constructivist view of reality says that what we call reality is actu-

ally something we have constructed. One advocate of this view is the sociologist Peter L. Berger, who says: "Reality is socially constructed (Berger 1963, 118)."
A constructivist value theory has been put forth by, among others, Niiniluoto. He sees values as relatively independent human constructs that belong to what Popper calls World 3 (Niiniluoto 1984, 318-319, 323-327). Constructivism in ethics can be seen as part of the more general constructivist value theory, since moral values are one type of values. Moral constructivism is represented by J.L. Mackie. He says for instance: "Morality is not to be discovered but to be made (Mackie 1983, 106)." He adds that in a way morality has to be remade in part, which does not exclude that there are general moral principles that do not have to be remade; the function of morality is to control conduct in such a way as to protect the interests of others rather than of the agent himdelf, to check on his spontaneous tendencies to act, and, if necessary, make him act contrary to them (Mackie 1983, 106, 123).

The view opposite to constructivism is usually called realism. In the philosophy of science realism means that we assume that there is a reality independent of the human mind and that science is the best way of getting access to this reality (Niiniluoto 1980, 230). As Tuomela (1983, 34-71) points out, there are different kinds of scientific realism. In ethics and value theory realism means that values have an objective existence independent of the human mind (see e.g. Vine 1983, 25-27). It is possible to have a constructivist view of values and a realistic view of knowledge.

What I advocate here is a so called modified constructivist view of both values and knowledge. By constructivism I mean in both cases that they are objects in World 3, and that neither of them is independent of the human mind. That this constructivism is modified means that as objects in World 3 they are not pure products of the mind,

they are products of the interaction between the human mind and the external world. The modification of constructivism is thus brought in by interactionism (see Vine 1983, 21-23).

This view, in addition to the pragmatistic position declared previously (e.g. p. 41), has implications for the way of conceiving the relationship between action and knowledge, which was one of the problems of this chapter. The relationship between action and knowledge works, as I see it, in three ways:

1. Action constitutes the a priori of knowledge.
2. Knowledge is constructed through action.
3. The function of knowledge is to serve as an internal action determinant.

The first point, that action constitutes the a priori of knowledge, means the same here as for the pragmatists and Tuomela: the mind does work with some kind of a prioric categories in constructing knowledge; the categories however are not transcendental but tied to man as an agent and social actor. Categories like time and place, causality, teleology, all make it possible for man to create knowledge that help him act in his different worlds. Here we might add that some of the a prioric element can also be part of man's biological make up - a view emphasized strongly by e.g. Piaget (1971 and 1985) and Lorenz (1974).

The second point, that knowledge is constructed through action, also has to do with the view of man as an agent and social actor. In outlining the view of action underlying this study I referred to Pörn and noted that it is through action sequences that man lives his life (p.49). This also means that it is through action sequences of this kind that man creates knowledge.

That the function of knowledge is to serve as an internal

action determinant can be understood as an extension of point 1. Namely, since action is the a priori of knowledge, the way in which human actors construct knowledge is such that the knowledge constructed, if it is done in accordance with the "knowledge making rules" e.g. of science, can in principle be used as action orientation. This is the same type of argument that was presented by Lewis and Rescher (pp. 32-33).

Whether knowledge actually does serve as an internal action determinant depends on whether an actor's internal action determinants are made up of knowledge or not. As I will put forth in the following, knowledge is not only a question of epistemic orientation but also of ability and values. When an actor possesses knowledge, knowledge is not only an object in World 3 but also in World 2, the actor's subjective consciousness. Some elements of knowledge can also belong to World 1, as will be pointed out in the following.

Axiological orientation, epistemic orientation, and ability, can all be made up of knowledge or of "ignorance".

Within the axiological system knowledge consists of value-knowledge. Moral knowledge and esthetic knowledge are types of value-knowledge. If we use the term moral knowledge, this means that we can say that an actor knows, for instanca, what is good and right, unfair and unjust, while some other actor may not possess this knowledge. We then talk of moral knowledge with respect to World 2. But we must also be able to say that the values in World 3 represent value-knowledge or not. This means that we need some kind of criteria in order to judge what values are based on knowledge and what values are not. Mackie (1983, 83-102) argues for the view that it is possible to establish criteria for morality and according to him this is done by a process of universalization going through three stages. I will not, this work,analyze possible criteria for moral knowledge. I

only want to claim that values can have knowledge status and that the way of judging this is in principle no different from judging knowledge in general. This view of value-knowledge is also consistent with the idea that knowledge in this area can be developed and that the criteria may need revision. But, again, this also concerns other types of knowledge. Having value-knowledge can then be conceived as having good values according to some justifiable criterion.

Within the epistemic system knowledge consists of factual knowledge. This type of knowledge corresponds to what previously has been called 'knowing that'. This is also the type of knowledge that best corresponds to what was called the classical concept of knowledge: a well-justified true belief (p. 1). The requirement that it be well-justified might not be necessary; it depends on whether the belief is articulated or not. Factual knowledge can include knowledge of a great variety of things. I may, for instance, know that the world is round, that my name is so and so, that if I do X, Y will happen etc. Factual knowledge can thus consist of knowledge of the world in general, knowledge of myself, and of my acts and their results and consequences, just to mention some examples.

Within the ability system knowledge consists of what has sometimes been called procedural knowledge. Cicourel (1986) makes a distinction between declarative knowledge and procedural knowledge meaning that declarative knowledge is knowledge of data, while procedural knowledge is knowledge of process. Knowledge of process means, according to him, both knowledge of how to do something and how to understand something. This knowledge is contextual and tied to experiences. It is often tacit, he says, while declarative knowledge relies on explicitly known inference rules and is less contextual. I will use the term 'procedural knowledge' to refer to knowing how, i.e. knowing how to carry out a process; I will not include the actor's understanding

of this process in this type of knowledge. A person who has procedural knowledge of, for instance, the process of riding a bicycle knows how to ride a bicycle. This again means, in v.Wright's terms (pp. 47-48), that on most occasions when the person tries to ride a bicycle, he will succeed. His success is dependent on the mastership of a set of techniques that he can coordinate and apply appropriately in a given context. It is not necessary, however, that he can declare or describe how he is carrying out the process. In this respect I tend to agree with Polanyi (1958, 49-50) in his analysis of skillful practice.

Value-knowledge, factual knowledge and procedural knowledge can be said to be different types of knowledge. These types of knowledge can be tacit or articulated (see e.g. Polnayi 1958, Part Two), and if they are ariculated, they can be articulated in different ways. Unarticulated knowledge has been touched upon previously in this study: familiarity, knowledge by acquaintance, tacit knowledge, implicit knowledge. Unarticulated knowledge is gained through interaction with the environment, when an actor makes the world his home, as Dewey might put it. An actor who has unarticulated knowledge of the world knows his way about and can act appropriately in various situations. His knowledge is, however, is unreflected and unarticulated; the actor cannot express his knowledge in concepts or other kinds of symbols and can therefore not reflect upon it.

When the actor's knowledge becomes articulated, he can express his knowledge in concepts and other kinds of symbols and his knowledge also becomes reflected. Can all knowledge be articulated? I am inclined to think not. An actor's value-knowledge and factual knowledge can be articulated while procedural knowledge, as I have defined it, cannot. Procedural knowledge is by definition expressed in action, while value-knowledge and factual knowledge can be

expressed in action as well as articulated in concepts and other symbols.

The problem of reflected versus unreflected and articulated versus unarticulated knowledge has been discussed to some extent in educational literature, so I will return to this problem in my treatment of educational knowledge.

For the moment I will only comment on some general ways of articulating knowledge. Three general ways are everyday language, science and art.

Knowledge articulated in everyday language often has what ethnomethodologists call en "emic" character: it is the way people themselves understand and explain their world, from the perspective of their own socio-cultural background and experiences (see e.g. Leininger 1985). This kind of knowledge also comes close to Koskiaho's 'daily life knowledge' (see p. 36-37). Engeström (1982, 102-105) contrasts everyday knowledge with theoretical knowledge, and says that everyday knowledge is based on immediate observation and experience, is unconscious and spontaneous and connected to isolated situations. It does not, according to him, constitute systems; it is describing and classifying and concerns the external properties of phenomena. I am not convinced that Engeström's view is correct is all respects. People's everyday knowledge may well be larger as well as deeper than what he assumes, and it may well constitute systems; it is only expressed in another language than the language of science.

That science and art can be seen as two different ways of articulating experience has been suggested by, among others, Dewey (p.33). The same idea is put forth by Goodman (1984, 1-5), who sees science and art as two ways of knowing.

The function of science is generally considered to be the creating of new knowledge about the world and formulation

of theories that state something about the world in terms of descriptions, explanations, interpretations (see e.g. Rosing 1978, 101-105 and Ödman 1979, 22-24, 50-52). One problem that has been discussed since Aristotle's classification of sciences into theoretical, practical and productive, is whether the role of science is primarily theoretical or whether the role of science is also to guide action. Niiniluoto (1980, 64-67) makes a distinction between the cognitivistic and behaviouralistic view of science. According to the cognitivistic view the role of science is to create a scientific world view, while, according to the behaviouralistic view the task of science in to formulate action principles. A special group of sciences are those that Niiniluoto (1984, 208-214) calls 'planning sciences'. According to him, planning sciences are, for instance, the science of education, nursing science and the science of economics. The task of these sciences is to formulate technical norms for the corresponding practices, he claims. I will return to this conception in the discussion of the nature of educational and health care sciences.

According to the pragmatistically influenced conception of knowledge that has been outlined in this study the role of science is directly or indirectly practical. We can, of course, make a distinction between a theoretical purpose that is more concerned with only describing, explaining and interpreting, and a practical purpose that is concerned with formulating guidelines for action. But, as e.g. Rescher (p.32-33) pointed out, since practice in general constitutes the a priori of science the whole endeavour of science is practical, even when the purpose is extra-pragmatic. Although descriptive, explaining and interpreting theories do not provide direct action guidelines, they may well help an actor to find his way about in the world; it can be part of his epistemic orientation, of his system of beliefs about the world and thus function as an internal action determinant.

As Goodman (1984, 1-8) points out, art is usually conceived as something apart from science; he sees them however as two ways of understanding the world. Hence they both belong to the realm of epistemology, which Goodman defines as the philosophy of understanding. He also criticizes the notion that science is only cognition, void of feeling, while art is mostly feeling, void of cognition. According to Goodman both art and science represent cognition, and there is feeling in all cognition. Dewey, who also saw art as a means of expressing knowledge, said that art widens and deepens our experiences, through art we can learn to see life in a new way (Dewey 1934, 83-89, 103). In its own way art makes life intelligible:

> "Tangled scenes of life are made more intelligible in esthetic experience: not, however, as reflection and science render things more intelligible by reduction to conceptual forms, but by presenting their meanings as the matter of a clarified, coherent, and intensified or 'impassioned' experience (Dewey 1934, 290)."

Collingwood (1960, 109-122, 288-289), who also sees art as a form of expression, says that art is in no way indifferent to truth. As expression art does not describe and generalize, it individualizes feelings and experience. Through different forms of expression the artist explores his own feelings, and by letting the audience take part in this, he helps them explore their feelings. Ultimately, says Collingwood, art strives for truth.

Art as well as science can thus be conceived as means of articulating knowledge about life and the world. In addition to science striving for generality while art strives for individuality, there is probably a difference in the "logic" of science and art. While science uses a combination of rational and empirical means in the process of articulating knowledge, art is more inclined to use metaphors. This point is stressed by Royce & Powell (1983, 4-5,

191-196). They have developed a theory according to which there is a connection between personality, modes of knowing and disciplines. I will return to this theory later. For the time being it may be sufficient to point out that they propose three modes of knowing - rationalism, empiricism and metaphorism. Rationalism and empiricism can be traced back to the epistemological traditions that have also been described in this study. According to Royce and Powell these modes of knowing have dominated during the past 500 years, and they are strongly connected to modern science and the philosophy of science. Metaphorism dominated during the Middle Ages and has, according to Royce and Powell, lived on in the arts and the humanities. They remark, however, that all three modes of knowing are involved in different disciplines, although, for instance science, art and religion, each gives greater credence to one of the modes.

Science and art can thus be conceived as two ways of articulating knowledge. Science - especially the natural sciences - formulates theories that are made up of statements about the world; these statements include formal (i.e. analytical, rational) as well as empirical aspects (i.e. synthetical, material). Art creates works that often in a metaphorical way express knowledge.

2.2.4 Conclusions

The epistemological point of departure in this study can be summarized in a few points.

1. Man is primarily an actor, living and acting in a bio-physical, a socio-cultural and a subjective world.
2. Living and acting in the three worlds constitutes the a priori of human knowledge.

3. Since living and acting constitutes the a priori of knowledge, knowledge is constructed in such a ways that an application of well constructed knowledge will directly or indirectly serve living and acting.
4. When knowledge becomes part of an action system, it functions as an internal action determinant.
5. There is a continuous interaction between knowledge and action so that knowledge is created in and through action and so that experiences that the actor acquires through action influences subsequent action.
6. Value-knowledge, factual knowledge, and procedural knowledge are three types of knowledge connected to the three types of internal action determinants. Having value-knowledge means knowing what values fulfill the criteria of good values. Having factual knowledge means having true beliefs about the three worlds in which one is living. Having procedural knowledge means knowing how to carry out a specific act or act sequence.
7. Knowledge can be unarticulated or articulated. Unarticulated knowledge is, for instance, tacit knowledge, familiarity, knowledge by acquaintance. Knowledge can be articulated in everyday language, science and art.

Knowledge, then, is not only one thing but many. Two concepts that have not appeared in the points of departure are 'theoretical knowledge' and 'practical knowledge'. One way of defining these concepts - that would be consistent with many prevailing definitions in the literature - would be to define theoretical knowledge as factual knowledge and practical knowledge as procedural knowledge. However, these concepts - crucial as they are to this study - will be defined later in order to let the inquiry into education and health care influence the definitions.

3. THE THESES, MODE OF ARGUMENTATION AND FRAME OF REFERENCE OF THE INQUIRY

The epistemological background makes it possible to formulate the theses and to outline the frame of reference for inquiry into knowledge in interactive practice disciplines.

3.1 Theses

The theses formulated here correspond to the aims of the study (p.6) and are derived from the epistemological point of departure. They can be stated as follows.

I. The role of knowledge in an interactive practice is to guide practice.
This thesis is derived from the pragmatically influenced view of knowledge, according to which the function of knowledge in general is to guide action.

II. The different types of knowledge in an interactive practice consist of value-knowledge, factual knowledge and procedural knowledge; some knowledge is unarticulated, some articulated.
This thesis is derived from the conception of knowledge types connected to the different internal action determinants of an action system.

III. Science is a way of articulating and creating new knowledge that can be used as an internal action determinant in the practice concerned.
This thesis is derived from the view of science as a practice that - together with everyday language and art - articulates knowledge. It is also a consequence of Thesis I.

IV. The theories of an interactive practice can have both a theoretical and a directly practical purpose but the theoretical purpose is also indirectly linked to the practical.
This thesis is derived from the view of science

as having both theoretical and practical purposes. However, according to the pragmatically influenced view of knowledge, also expressed in Theses I and III, the function of all knowledge is directly or indirectly related to action.

3.2 Argumentation and material

The purpose of the argumentation to follow is to defend the theses and to explicate them so that new views and conceptions can be a result of the argumentation.

In the argumentation and explication two types of material will be used: literature and examples.

In the epistemological background mainly philosophical literature was used. Literature on knowledge in education and health care was hence not used to back up the original formulation of theses. This area of literature will now be used to defend and explicate the theses.

Literature on problems and aspects of knowledge and education is legion, because, as also Hirsjärvi (1985, 58) remarks, one of the central tasks of education has to do with knowledge: the task of the teacher is to transmit knowledge, the curriculum should reflect what knowledge is considered valuable and how this knowledge can be attained. Much of the literature on knowledge and education thus concerns teaching-learning problems and curriculum problems (see e.g. Brubacher 1962, Ch.4; Harris 1979; Hirst 1974; Peters 1973; Pring 1976). Although learning and curriculum problems are not irrelevant to this study they do not constitute the main problem. Thus I have omitted much of the literature on these problems. Instead I have chosen literature that deals with knowledge in and about education, i.e. knowing how to educate, being able to interact in educational contexts, having theories to understand and explain

education etc. These areas naturally become relevant to teaching-learning problems and curriculum problems in teacher education.

The same kind of literature has been chosen in the health care area: literature on knowing how to care, how to interact in health care contexts, having theories to understand and explain health care etc. Most of the literature used from this area concerns nursing care. One reason for this is that there seems to be a lively interest in questions concerning nursing knowledge and nursing theories for the time being. Medical care is also represented in the literature, since this is an old discipline with much research done. What makes medical care interesting is that there seems to be a growing interest in philosophical and epistemological problems (see e.g. Jensen 1983; Jääskeläinen 1983; Louhiala 1984; Pellegrino & Thomasma 1981; Rimpelä 1976; Söderfeldt ed. 1985; Törnebohm 1985). Occupational therapy and physiotherapy again are less represented in the literature. The choice of literature in the field of health care raises the question of whether the line of argument is applicable to the whole field or whether it should be restricted to nursing care and medical care. However, there are strong arguments for a view according to which all the sub-practices in health care are strongly related and actually just sub-practices of one main practice - care (see e.g. Downie & Telfer 1980, ix; Sarvimäki & Stenbock-Hult 1988). Then there is also a high degree of transfer between the sub-practices. Since the problems and theses in this study are common to all the sub-practices of health care, it seems possible to generalize the line of argumentation.

In addition to literature from the fields of education and health care, some of the philosophical works used in the epistemological background will be referred to anew, and some additional material will be used.

The literature is not gathered into an inclusive review but the different works and thoughts will be treated as they fit into the argumentation.

In addition to analysis of literature, systematic exemplification from the practices concerned will be used to clarify and support the line of argumentation.

The order of the treatment of problems and theses will follow the structure of an interactive practice discipline.

3.3 Frame of reference: the structure of an interactive practice discipline

One of the problems of this study, preceding the main problems, is to clarify what is meant by an interactive practice discipline. Such a conception presupposes a definition of the concept of a discipline in general as well as a view of the classification of disciplines.

3.3.1 The concept of a discipline

According to Donaldson and Crowley (1978) disciplines are ways of organizing human knowledge: disciplines are bodies of knowledge that also constitute realms of learning. Similar views have been presented by e.g. Fagermoen (1981), and Karoliussen and Smebye (1985, 227-228); the latter ones add that a discipline also includes an area of research.

While these characterizations concentrate on discipline as a body of knowledge and realms or areas of education and research, Phenix (1964, 317) and Pring (1976, 25-28) also emphasize that a discipline is characterized by a way of learning, a mode of inquiry, i.e. studies in a specific discipline do not consist of memorizing facts but of learning how to solve problems and create something of value in that discipline.

A discipline is thus characterized by:

- a body of knowledge
- an area of research
- an area of teaching and learning
- a mode of inquiry and learning.

3.3.2 Classification of disciplines

Various attempts have been made to classify disciplines. Many of the attempts make some kind of basic distinction between academic or scientific disciplines on the one hand and professional or function oriented disciplines on the other. The academic or scientific disciplines are usually considered as consisting of the "traditional" sciences, i.e. natural sciences and humanities and as searching for knowledge "as such" or knowledge organized in descriptive theories. The professional or function oriented disciplines are considered as related to a specific practice and as pursuing practical aims; knowledge in these disciplines is organized in descriptive as well as prescriptive theories. (Donaldson & Crowley 1978; Fagermoen 1981; Thomsen 1973)

According to these classifications education as well as the different areas of health care would be conceived of as professional or function oriented disciplines.

A classification system that resembles the ones related above but that also has its own original aspect has been developed by Phenix. He too makes a distinction between what he calls fundamental disciplines and applied or derivative studies. The fundamental disciplines consist of six types that corrspond to six patterns of meaning or modes of understanding. (Phenix 1964, 6-7, 273)

Behind the classification of fundamental disciplines into realms of meaning is a view of man as a being searching for and creating meaning (Phenix 1964, 21). Phenix says:

> "A human being is in essence a creature who creates,discovers, enjoys, perceives, and acts on meanings. These meanings are of six general kinds: symbolic, empirical, esthetic, synnoetic, ethical, and synoptic, corresponding respectively to the distinctive human functions of expressing and communicating, describing, making and perceiving significant objects, entering into relations deciding between right and wrong, and comprehending integrally. Each of these realms is defined by a certain general logic of meaning. Within each realm there are special fields of study, each defined by its own subject matter, typical concepts, and methods of inquiry. Yet all these exhibit the general logic of the realm to which they belong." (Phenix 1964, 48)

The six realms are made up of different disciplines in the following way:

Realms of meaning	Disciplines
Symbolics	Ordinary language, mathematics
Empirics	Physical sciences, life sciences, psychology, social sciences
Esthetics	Music, visual arts, arts of movement, literature
Synnoetics (Personal knowledge)	Philosophy, psychology, literature, religion, in their existential aspects
Ethics	The varied special areas of moral and ethical concern
Synoptics	History, religion, philosophy

Table 3.1 Realms of meaning and their corresponding disciplines according to Phenix (modification of Phenix 1964, 28)

The derivative or applied fields of study are built up around practical concerns and they derive and apply meanings from the fundamental disciplines. Examples of derivative fields are the skilled crafts, engineering, law, and

education. Thinking in the applied fields and in cross-disciplinary studies are according to Phenix very demanding and tend to be nondisciplined because of the mixture of methods and concepts. Thus they presuppose greater skill, care, and mastery of material than studies within the fundamental disciplines. To learn to cross the discipline lines is however an important educational goal. (Phenix 1964, 318-320)

If Phenix's classification system is adopted to education and health care, the conclusion must be drawn that these fields of study belong to the derivative or applied fields; Phenix himself places education among these fields. He also remarks that education draws on all the fundamental disciplines (Phenix 1964, 319). An analysis of the different sub-practices of health care would probably lead to the same conclusion.

3.3.3 The structure of an interactive practice discipline

Interactive practice disciplines, according to the characterizations and classifications so far, can be described as bodies of knowledge, areas of research, teaching and learning, and modes of inquiry and learning that evolve around distinct practices where interaction plays a central part. The knowledge created and transmitted in these disciplines, to a high degree, can be viewed as a derivation and application of knowledge from fundamental disciplines, i.e. disciplines that are not related to any specific practices but only to the growth of human understanding in all its areas.

Thus the term 'applied discipline' could be substituted for 'interactive practice discipline'. However, the term 'interactive practice discipline' brings forth at least two important points that are relevant for this study:

1. the disciplines concerned here are not any applied fields but expressly knowledge fields that evolve around human interaction,
2. the point of departure for the study of knowledge in these disciplines is the nature of the interactive practice, not the fundamental disciplines.

Reijo Wilenius (1975, 11, 39-40) has developed a view of education and its auxiliary practices that expressly takes its point of departure in education as the primary practice. The task of educational acts is according to Wilenius to support and stimulate the intentional growth of the child or student. In the same way the educational acts are auxiliary with respect to intentional growth educational practice has its own auxiliary practices. The auxiliary practices are called secondary practices and they are: research, education of the educators (especially teachers), and the administration, planning and development of education. Wilenius also indicates that the whole area of social policy might be seen as a tertiary practice with the supporting of primary and secondary practices of education as an important task.

Since education as well as its support systems are characterized as practices, they can be described in terms of action systems. That is, they go through action sequences consisting of inquiry, planning and deciding, implementation, and they are influenced by internal as well as external action determinants. If the interactive element on the primary level is stressed, this practice can in turn be described as two or more action systems interacting with each other.

If this same idea is adopted to health care, both education and health care can be seen as hierarchies of practices, where the interactive practice constitutes the primary level, research, education of practitioners, and administra-

tion the secondary level, and social policy in general the tertiary level (fig. 3.1).

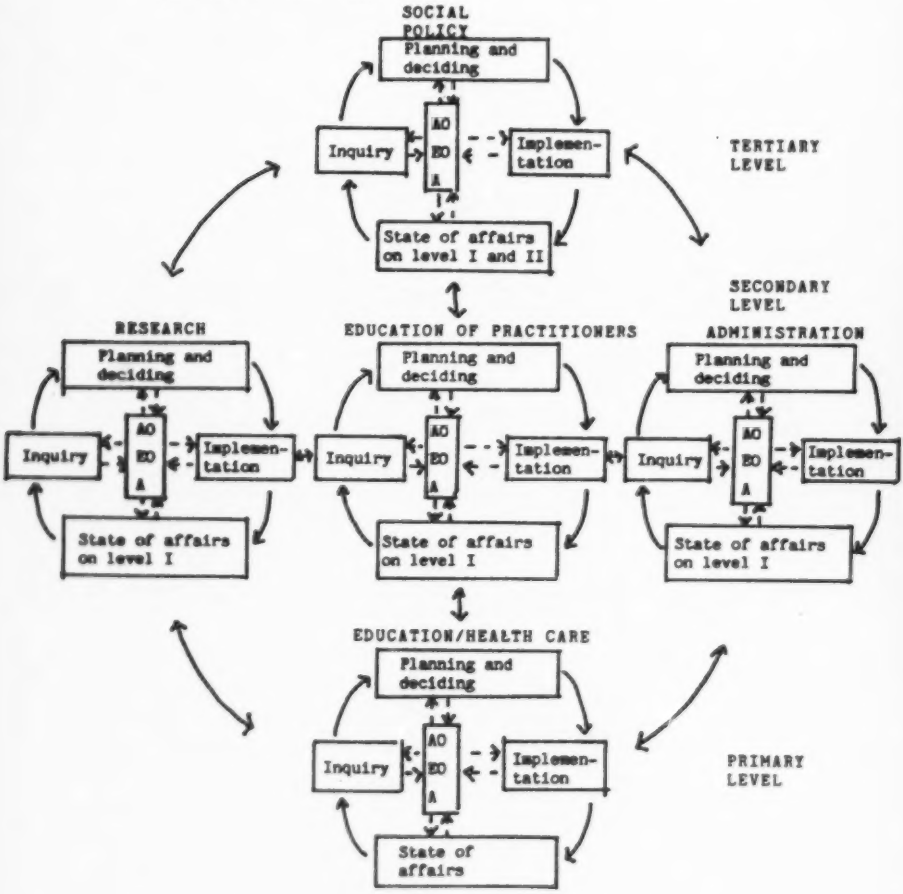


Figure 3.1 The disciplines of education and health care as hierarchies of practices

In figure 3.1 the primary practice - for the sake of simplicity - has been depicted as one action system instead of as an interaction between several systems. For the same reason the external action determinants have been omitted. Furthermore, the control loops between the systems are only indicative: they indicate the existence of feedback between the systems without specifying different kinds of connections between the systems.

The disciplines of education and health care can now be specified as:

- bodies of knowledge related to education and health care
- areas of research, teaching and learning, administration and planning, and social policy
- a mode of inquiry, learning and administration.

This specification of the concerned disciplines includes the systems of administration and social policy in the disciplines and adds a mode of administrating to the modes of inquiry and learning.

3.4 Continuation of the study

In this study the main focus is on knowledge in the primary practices of education and health care and on research as a support system for practice. Some consequences for education will be discussed but the education of practitioners as well as modes of teaching and learning will not be studied in depth. Administration and social policy will hardly be dealt with at all.

The inquiry will start with knowledge in the primary practices and then continue with the research system.

4. KNOWLEDGE IN INTERACTIVE PRACTICES: PRACTICAL KNOWLEDGE

This chapter deals with theses I and II of the study, i.e. with knowledge as a guide of the interactive practices and as consisting of different types.

The totality of knowledge as it manifests itself in the interactive practice will be conceived of as practical knowledge. Practical knowledge is thus a very comprehensive type of knowledge, including other types of knowledge and manifesting itself as proper courses of action in different situations.

This view does not in all respects correspond with the view of practical knowledge that is prevalent in educational and health care literature.

4.1 Some accounts of practical knowledge in educational and health care literature

Much of the literature on practical knowledge in education and health care use this term in the sense that the terms 'procedural knowledge' and 'skill' have been used previously in this study. This use of the term 'practical knowledge' usually goes back to Gilbert Ryle's and Michael Polanyi's analyses of skills and 'knowing how'.

4.1.1 'Knowing that' and 'Knowing how'

Ryle (1976, 26-60) distinguishes between two types of knowledge: knowing that and knowing how. These two types have been touched on previously in this study - Hintikka used them to refer to the conceptions of theoretical and practical knowledge in the thoughts of the Ancient Greeks. According to Ryle 'knowing that' and 'knowing how' are two logically separate types of knowledge that are irreducible to

one another. 'Knowing that' means having knowledge organized in propositions and prescriptions; it is knowledge of what is the case. 'Knowing how', on the other hand, means having practical knowledge, knowing how to do things, how to perform certain tasks. It is possible, according to Ryle, to 'know that' without 'knowing how' as well as it is possible to 'know how' without 'knowing that'. The exercise of a skill does not presuppose any propositional knowledge of the skill and its performance.

Polanyi (1958, 49-57) expresses a similar view in his analysis of skills. For instance, in order to ride a bicycle you do not have to be able to account for how you use the centrifugal forces. However, according to Polanyi, skills are only one aspect of a larger type of knowledge, personal knowledge, which refers to the whole way in which a subject participates in 'the Art of Knowing'.

Ryle's and Polanyi's ideas have been adopted to educational and nursing contexts by several authors.

Hartnett and Naish (1976, 107-121) discuss the difference between knowing in theory and knowing in practice. By 'knowing in theory' they refer to Ryle's 'knowing that' and by 'knowing in practice' to 'knowing how'. They also refer to Polanyi and firmly stress the point that practical knowledge - the intelligent and critical exercise of skills - cannot be put into propositions. Practical knowledge always has an unspecifiable and ineffiable element, it can be acquired only through practice and it can also be dependent on characterological factors.

Pring (1976, 16-24) also uses the terms 'belief-type' and 'procedural-type' when referring to theoretical knowledge as 'knowing that' and to 'practical knowledge' as 'knowing how'. He points out the importance of practical knowledge in education, since propositional knowledge does not cover everything that is important to learn.

Burnard (1987) distinguishes between propositional, practical, and experiential knowledge. By propositional knowledge he means the same as Ryle's and Pring's 'knowing that', while experiential knowledge covers knowledge gained through direct encounter with persons and things. Experiential knowledge is synonymous with Polanyi's personal knowledge. Finally, practical knowledge consists of skills like giving an injection, driving a car, and counselling. It then corresponds to Ryle's and Pring's 'knowing how' or procedural knowledge. Burnard says:

> "It is important to note, however, that a person may develop considerable practical knowledge without necessarily developing the appropriate propositional knowledge. Thus, I may become skilled in giving an injection without necessarily knowing why I am giving it and without knowing the possible consequences of my actions."

Burnard's view of practical knowledge corresponds to the type of knowledge that in this work is called procedural knowledge, but not necessarily to practical knowledge as it has been envisaged.

Ryle's distinctions have also been criticized for being too restricted. Martin (1970), for instance, analyzes 'knowing how' and comes to the conclusion that there are three different types of 'knowing how'. Type A consists of skills and capacities that are learned through practice, like cooking, doing logic, and playing tennis. Type B does not require practice but consists of knowing how to answer questions correctly. Knowing how the accident happened, for example, means that one can answer questions about the accident. However, this does not require practice but propositional knowledge. Type C, finally, includes knowing moral judgments or rules of conduct. According to Martin the 'knowing how' of Type C consists of an action tendency rather than of a capacity and thus does not either require practice. Martin concludes that Ryle's 'knowing how' actually covers only Type A and that Type C needs another term than 'knowing how' in this sense.

Ryle's account of 'knowing how' has also been criticized by Entwistle (1976). According to Entwistle Ryle does not take into account that many skills are very complex and presuppose both practical and theoretical knowledge. In a ball game, for instance, it is not enough to be skilled in hitting and running, you must also be able to judge the total situation and decide when to do what. Entwistle agrees with Ryle that to learn skills requires practice and that theoretical knowledge is not enough for the exercise of skills. Practice is needed primarily to develop the tactile dimension that according to Entwistle is included in almost all skills. However, what Entwistle opposes, is the view that the exercise of skills be independent of theoretical knowledge:

> "On the other hand, reasons have been advanced for believing that theorizing may helpfully precede and accompany practical learning and for the view that knowing how to do something intelligently often depends upon reference to theoretical knowledge about the contexts in which a skill is practiced. Similarly, a proper understanding of the contingent experiences of daily life depends upon the acquisition of a considerable cognitive repertoire." (Entwistle 1976, 50)

Operating skill, for instance, is dependent on making the right diagnosis and teaching skill is dependent on experience of the class and the individual pupils; this makes it possible to adapt ones own action and to intervene at the right moment (Entwistle 1976).

The contextual nature of practical problems has also been pointed out by Gauthier (1976), who moreover emphasizes that the context has a dynamic aspect. Practical problems also have a personal aspect: they always confront a certain person. Finally, they are met by action, they are solved by doing the right thing.

Practical knowledge interpreted as 'knowing how' in Ryle's sense thus seems to be restricted to fairly limited skills and procedures. There are, however, larger conceptions of

practical knowledge in educational and health care contexts.

4.1.2 Practical knowledge as situational and contextual, personal and experiential

Sternberg and Caruso (1985) define practical knowledge as "procedural information that is useful in one's everyday life". On the one hand they distinguish between procedural knowledge and declarative knowledge, on the other hand between knowledge relevant and irrelevant to everyday life. According to their classification practical knowledge has to fulfill two criteria: it has to be procedural and it has to be relevant to everyday life. The other combinations they call academic knowledge, which is then either declarative or procedural knowledge irrelevant to everyday life. Practical knowledge, according to Sternberg and Caruso, is mostly stored in the form of production systems embedded in general scripts. Nonprocedural knowledge, on the other hand, is stored in systems of interrelated concepts.

Sternberg's and Caruso's concept of procedural knowledge does not differ in principle from Ryle's, Pring's and Burnard's corresponding concepts. What Sternberg and Caruso add to the concept of practical knowledge, however, is the criterion of relevance for everyday life. Thus, they emphasize the context where this knowledge is used. But since they do not specify what is meant by "everyday life" this criterion becomes very vague. An academic context, for instance, belongs to the everyday life of many professionals. And what about other work contexts, like schools and hospitals? Do they represent everyday life?

Wilenius (1975, 21-38) uses the practical syllogism as a model in defining practical educational knowledge. Practical knowledge is according to him knowledge that is expressed or manifested in action. Hence, the logic of

action provides the clue to practical knowledge. According to Wilenius the practical syllogism indicates three large areas that together constitute educational knowledge: knowledge of goals, knowledge of the situation and knowledge of means. These areas of knowledge are in their turn connected to knowledge of the development of human beings, knowledge of the present and future society, of the concrete educational situation, and of the curriculum. Thus, Wilenius' view of practical knowledge is larger than the concept of procedural knowledge, also including knowledge of the society in which education takes place.

Freema Elbaz has used case study as a method to develop a view of practical teaching knowledge. Practical knowledge is according to her oriented to situation, personal, social, and experiential, and it also has a theoretical orientation. It is structured into rules of practice, practical principles and images. The rules of practice are specific prescriptions about what to do in concrete situations. The practical principles are more inclusive and less explicit, and include, for instance, the teacher's general purposes and beliefs. The images are least explicit and most inclusive. They hold the teacher's general ideas about what teaching should be like and are made up of the teacher's feelings, values, needs, and beliefs, as well as of theoretical knowledge and folklore. The teacher's own experience is crucial for all practical knowledge. (Elbaz 1983, 13-22, 101-145)

One of Elbaz's (1983, 3-6) main ideas is that teachers, during their work, create a considerable amount of knowledge that they use in their work but that is not necessarily conceptualized. Their practical knowledge is, so to speak, immanent in their practice. It is this immanent knowledge that she wants to uncover.

The idea of practical knowledge as embedded in practice and

as situational, personal and experiential can also be found in Donald Schön's The Reflective Practitioner (1983), Patricia Benner's From Novice to Expert (1984), and David Hunt's Beginning with Ourselves in Practice, Theory, and Human Affairs (1987).

Schön criticizes what he calls the technical rationality in practical professions, i.e. the idea that these practices consist in the application of standardized, specialized and scientific knowledge to instrumental problem solving. Rather, the practicians find themselves involved in personal relations, concrete action situations, and value conflicts. In his practice, the professional develops knowledge that is often tacit and spontaneous, embedded in routines; he is knowing-in-action. In order to break the routines he also needs reflecting-in-practice. In the reflective practice the practitioner surfices and criticizes his own action - ends as well as means - and he becomes a researcer in the practice context, his practice becomes a "reflective conversation with a unique and uncertain situation". The relation between the practitioner and the situation is transactional: on the one hand his understanding is shaped by the situation, on the other hand he shapes the situation. (Schön 1983, 21-30, 49-69, 130, 150-151)

The purpose of Benner's study was to uncover knowledge embedded in clinical nursing practice. She refers to practical knowledge as 'know-how' in the sense of Polnayi's personal knowledge and skills, which means that she sees this knowledge as founded in personal experience. In order to describe the development of skills in clinical nursing practice Benner uses a model developed by Stuart and Hubert Dreyfus. According to this model skilfull practice develops through five stages: 1. Novice, 2. Advanced Beginner, 3. Competent, 4. Proficient, and 5. Expert. The stages describe how the practitioner becomes less dependent

on abstract models and rules in her practice, at the same time freeing her attention to the total situation. Her functioning becomes more flexible, intuitive, relying on experience and observation. Benner's own study involved dialogue with nurses, identifying the five levels of competency. She also identified six areas in which practical knowledge can be organized: 1. graded qualitative distinctions, e.g. the ability to recognize subtle physiological changes, 2. common meanings that form a tradition and that can be made explicit through narrative accounts, 3. assumptions, expectations and sets, e.g. predispositions to act in certain ways in certain situations, 4. paradigm cases and personal knowledge, e.g. important experiences that have influenced the nurse's foreknowledge, 5. maxims, i.e. "cryptic instructions that make sense only if the person already has a deep understanding of the situation", and 6. unplanned practices, including the development of new know-how in areas that actually do not belong to the nurses. (Benner 1984, xvii, 1-38)

Hunt uses the term 'implicit theory' to refer to the fund of experience practitioners use in their practice. The practice of teaching he describes as a process of "reading" the situation and "flexing" one's intentions and actions depending on the changing circumstances. The implicit theory a teacher (or counselor, supervisor, theorist) uses in the reading-flexing process can be made explicit through concepts, matching models and metaphors. (Hunt 1987, xi, 1-2, 53-83, 145-149)

The works related here represent a coherent line of thought, although there are differences between them. They can be said to be part of a tradition in educational and caring literature that strongly emphasize the importance of experience, experimentation, confrontation and personal aspects of practice and learning. Dewey is, of course, one of

the main figures in this tradition. Others are, for example, David Boud, Rosemary Keogh, and David Walker (1985), Peter Jarvis (1987), David Kolb (1984), and R.S. Usher (1985;1986a;1986b).

Thus,in educational - and also in caring - literature practical knowledge is quite generally described as knowing how or procedural knowledge that is personal, experiential, contextual and embedded in practice. Some of it is tacit and ineffiable, but it is also organized in shared meanings, images, and metaphors, and it can be reflected upon. What is less visible is the ethical side of practical knowledge. Martin (1970) touched upon knowing how as moral judgment and rules of concuct but concluded that another term is needed for this type of knowledge. Schön (1983, 49, 68) touched upon it, when he included value conflicts in practitioner's situation and when he united ends and means as objects of reflection-in-practice. The reason why ethics does not seem to be part of practical knowledge can be seen as symptomatic of the current view of education and health care - they are rather conceived of as techne or poiesis than as praxis and they tend to emphasize maker's knowledge more than user's knowledge , to use the terms of the Ancient Greek. Carper (1978) recognizes ethics as the moral component of nursing knowledge, in addition to empirics, esthetics, and personal knowledge, but she does not relate it to the concept of practical knowledge; however, her article indicates that she sees these four patterns of knowing - as she calls them - as relevant for nursing practice. Another aspect missing in much of the literature on educational and health care knowledge is the collective side of practical knowledge. Benner (1984, 6) touches upon the subject when she describes the common meanings as something that is shared among nurses and as forming a tradition.

4.2 Knowing how to educate and care

The conception of practical knowledge in education and health care that is to be outlined here is founded on a view of these practices as fundamentally moral forms of life. This gives moral knowledge a crucial part in educational and health care knowledge. Practical knowledge is however not only moral but can be seen as the most comprehending form of knowledge in a practice discipline, drawing also on theoretical and procedural knowledge.

4.2.1 Education and caring as moral forms of life

In chapter 2.2 knowledge was related to living and acting in the sense that living and acting are seen as the a priori of knowledge as well as the context or process in which knowledge is created and used. In the same way educational and caring knowledge can be understood in relation to education and health care as forms of living and acting.

The concept of 'forms of life' has been coined by Ludwig Wittgenstein and it is related to another central concept of his - 'the language game'. Words and expressions get their meaning from the way we use them, from the language game, which is a practice governed by rules. The language game again is related to forms of life in that some words and expressions are applicable only to certain forms of life. For instance, concepts referring to a character of human handwriting has no application to beings that do not write. (Wittgenstein 1981, 8-23, 174-180, 226)

This idea has been used by e.g. Richard Wollheim (1984) to describe art as a form of life, meaning that the a so-called artistic intention or impulse as well as concepts referring to art should be understood not prior to the institution of art - or life form of art - but as a part of it. Carola Sandbacka (1987, 18-21, 62-74, 92-93) again uses the

idea to show how an understanding of other cultures is possible. She sees cultures as different life-forms, characterized by shared practices that constitutes the foundation for the understanding of language.

Now, how can this help us understand education and health care? Firstly, the socio-cultural context in which education and health care take place can be conceived of as a form of life, a "game" with distinct rules, practices, shared meanings; education and health care are part of this form of life, determined by the same rules and meanings. Secondly, education and health care can be understood as separate life-forms within this larger form, being characterized by their own shared practices and rules that give a common meaning to what takes place within these forms of life.

As parts of a larger form of life education and health care are not only themselves influenced by this form. They also influence the life-forms of which they are parts. As conservative forces they work as means of social control: they maintain and transmit common practices, meanings, values, and traditions. As reformative forces they can contribute to a renewal of the surrounding life-form: new meanings, values and practices can be generated. That education can be seen as a social force with both conservative and reformative impacts is a generally accepted notion. That caring practices have the same function is perhaps not equally generally recognized but doubtlessly health care has a great influence on our life and society through different health care practices and through ideas about what is good and bad for you, what is healthy and unhealthy. The role of medicine as a form of social control or "ideological practice" has been pointed out by, among others, Illich (1975), Robinson (1978, 106-108), Szasz (1974), and Söderfeldt (1985, 115-125).

As specific life-forms within a larger socio-cultural life-

form, education and health care are not neutral. Their task is to preserve a life-form that is considered valuable or to improve it, if it is not considered satisfying. Either way they are committed to the maintenance and creation of valuable life-forms.

This socio-cultural aspect of education and health care brings out what in Aristotelian terms could be called the "praxis"-side of these practices: they are forces in the continuous development and creation of human life-forms. This also points to an important area of educational and health care knowledge - knowledge of valuable life-forms and of the current state of the surrounding life-form. Thus, this is what also has been called "user's knowledge", knowledge of what role education and health care play in a larger context of human life-forms. Wilenius' (1975, 30-33) conception of educational knowledge includes elements that touch upon these aspects, because he views futurological knowledge and knowledge of society as elements of educational knowledge. An emphasis on educational knowledge as socio-cultural and political-ethical knowledge can also be found in Edgar Dale's (1973, 1975 and 1981) and Paulo Freire's (1972 and 1976) conception of education as social praxis. Lars-Olof Edström (1969, 11) also says that teaching, in its widest sense, is a political act.

The view of what is to be considered as a valuable form of life is refelcted in the view of the goal of the practices concerned: the well and educated person is one who can take part in and contribute to a valuable life-form. This connection between on the one hand ethics, view of life, man and society, and on the other hand the goal of education has been explicated by, among others, William Frankena (1965, 7-9), whose point of departure is J.S. Mill's (1872, 547-553) view of the logic of practical arts. According to Frankena every decision in the practice of education has both a knowledge base and a value base, in other

words, both a value- or goal premise and a premise about means. The goal premises of the practice is derived from more overreaching premises about goals and values. Thus, behind this model is again the practical syllogism. The model has been further adjusted to educational contexts by Hirsjärvi (1975) and to caring practice by Sarvimäki (1984, 9-13) and Kalkas (1984 and 1985, 31-43).

A look at some definitions of the concept of health may reveal this connection between goals of a practice and a view of a valuable form of life. In most health care practices health is conceived if not as the goal, so at least as one important goal. Health is conceived by Maslow (1976, 24-56), for instance, as complete humanity, self-realization, creativity and personal development, and by May (1978, 36) as creativity and self-realization. Johnsson and Ohlsson (1977, 132-135) see health as the ability to take responsibility and be in charge of one's own life, and Illich (1975, 154) conceive of health as a virtue: the individual's capacity for autonomuous adaptation with respect to the social and cultural reality, the capacity to take responsibilty for oneself and for others - a task that requires self-awareness and self-discipline. These definitions show that the concept of health includes values. It is, as Downie and Telfer (1980, ix) say, an expression of a value judgment, a judgment about what kind of life is worth living and how people ought to live. The definitions related here tell us, for instance, that a life worth living is one in which people can be creative, develop and realize themselves, and take responsibility; this is also, mutatis mutandis, how people should live. In the same way, we may conclude, views about the goal of education can be seen as value judgments about what kind of life is worth living, about what can be considered as a valuable form of life.

This can be seen, for instance, in documents laying the foundation for an ongoing reform of vocational education in Finland. According to the initial idea (Komiteamietintö 1973: 52, 12-23), vocational education - including education in many health care areas - should promote a society characterized by spiritual and material welfare, freedom, security, comfort, many-sided development of the individuals, and the development of equality, democracy, cultural life, and international understanding. These features can thus be seen as a conception of a good society, providing the foundations for a valuable life-form, and the role of education is, according to the plans, to promote this society and this life-form.

The relationship between the practices of education and health care on the one hand and the conception of a valuable life-form on the other hand is complex. Firstly, the goals of the practices reflect a conception of a valuable life-form. This relationship is essentially conceptual, which means that an analysis of the goals reveals the conception of a life-form. This can be seen in the definitions of the concept of health on the previous page. Secondly, there is an empirical-causal relationship between them, which means that the practices concerned are supposed to promote a valuable life-form by pursuing certain goals. This relationship can be seen in the ideas behind the educational reform mentioned, where educational policy is seen as a means for social policy. A third relationship that can be conceived of between life-form and the practices in question includes not only the goals but the whole practices. This relationship involves education and health care as manifestations of a valuable life-form, which means that not only the goals but everything that goes on in the practices - the main principles, the relationships between the participants, the methods, etc. - should be seen as an example of what is meant by a valuable life-form.

Questions about what kind of life is worth living and about

how we should live are moral questions. Since these are the questions education and health care ultimately deal with, they can be conceived of as moral forms of life. Naturally, they could also be called moral practices. The reason why they primarily are seen as life-forms and secondarily as practices is that I want to emphasize the shared meanings, rules and traditions that are immanent and determine them as practices. The view of education and caring as life-forms also shifts the focus from mere acting to a way of being and living. Being an educator, a nurse or a doctor, for instance, does not involve only doing things, it also involves being in a certain way, sharing certain meanings and values, relating and living in a certain way, when operating within the life forms of education and health care. It involves taking a position on the question of valuable life-forms. These decisions are not necessarily always conscious but a teacher's way of teaching and a health care provider's way of providing care is always a manifestation of his or her position to the questions of a life worthwhile. Living within a certain form of life means participating in it, and in participating one always becomes morally responsible - whether one refrains from doing anything or tries to change the form of life.

While the term 'form of life' or 'life-form' refers to a whole way of being, living and relating, of sharing meanings, values and traditions, the term 'practice' refers to doing, acting and making. In this work 'practice' refers to acting as described in the action sequence, i.e. a practice is conducted through acquiring information, planning and deciding and implementing action. A practice is related to a life-form in the sense that the way it is conducted is determined by the shared meanings, values and traditions of the life-form of which it is part.

Thus, since the practices of education and health care are part of a moral form of life, they can also be conceived of as moral practices. The moral nature of the concepts of

education and health care as well as of these practices has been pointed out by several authors (see also Sarvimäki 1987a, 1987b, 1987c, 126-127, and 1988).

Daveney (1973), for instance, explicitly argues for the view that the concept of education is a moral concept. He says:

> "My main thesis can be stated quite simply: when we speak of education, there is presupposed either an ideal of a person to which the education is leading; or alternatively an ideal of a society for which the education fits the individual member. But in any case - and this is the important part - lying behind the concept of education is the notion of a norm or a set of norms which gives the education its purpose." (Daveney 1973, 79)

Daveney (1973) argues that always when we use the concept 'education' we refer to a process or an activity that aims at something good. He also makes a distinction between technical problems and moral problems in education. The technical problems have to do exclusively with the methods while, according to him, the moral aspects come in when we discuss the aims of education. And since education always has an aim or a leading idea of some sort, we cannot exclude the moral aspect when we discuss education. Daveney concludes that an educational debate is always a debate about society:

> "If we are going to be clear about the sort of educational system we want, then we must be clear about our notion of the good society. Education inevitably is a moral concept, and educational discussions of a non-technical kind are, logically, moral discussions." (Daveney 1973, 95)

That the socio-cultural aspect of education, which is reflected in the aims of education, has a moral dimension is emphasized by Daveney, and this point has also been made in this work. What is not necessarily the case, however, is that questions about methods be purely technical, void of moral aspects. Here Daveney seems to make a clear distinction between praxis and techne, means and ends, in education: questions about the aims of education belong to

the realm of praxis, which includes ethics, while questions about means and methods belong to the realm of techne, which only considers how the end is going to be achieved. This view also makes a clear distinction between user's knowledge, belonging to praxis, and maker's knowledge, belonging to techne and thus also being non-ethical. If, on the other hand, education is seen as a moral life-form, everything that is part of this life-form has a moral aspect - even the means and methods used. The view of education as a form of life then makes it impossible and also unnecessary to distinguish sharply between means and methods. This view is also defended by Richard Peters (1967, 5-9; 1970), who says that if education means learning a valuable form of life, we cannot make a clear distinction between means and ends, since the values we pursue must leaven the whole process; the end is not something that is technically produced by ethically neutral means. This also implies that if the practical syllogism in Frankena's and Mill's interpretation is used as a model for understanding practical arts, it is not only the aims that are derived from more overreaching principles about life, ethics, man and the world, but also the means and methods. In short, the whole practice of education or health care and everything that goes on in it is tied up with a life-form.

Alan Tom (1984, 79-119; 1985) does not analyze the concept of education but the practice itself and advocates that teaching be conceived of as a moral craft. He contrasts two conceptions of teaching: the applied science view and the moral craft view. According to the first view teaching consists in applying research results to the activity concerned. Tom criticizes this view and says that research findings can never provide significant guidelines for teaching practice. There are two reasons for this. Firstly, the connection between theory and practice is always loose, and it is not possible to derive clear-cut guidelines from a research based theory to a practice. Secondly, normative con-

siderations are central to all curriculum decisions but the focusing on research-based theory tends to obscure these normative considerations. There are, according to Tom, basically two factors that determine teaching as a moral art: the normative considerations of the curriculum and the unequal teacher-student relationship. He defines the craft and the moral basis of teaching in the following way:

> "Teaching is a craft - much like fishing and gardening are crafts - because teaching fits the definition of craft, that is, the application of knowledge and skill to attain some practical end. At the same time, teaching is more than a craft because education necessarily involves designing a curriculum to 'improve' students.
> /.../
> Teaching is also more than a craft because teaching involves a human relationship between people of unequal power. Since teachers do have considerable control over the lives of the students and are inevitably involved in forming students in desirable ways, teaching can be said to have a moral as well as a craft basis. Teaching, therefore, can be conceived of as moral craft." (Tom 1985, 149)

Tom's way of defining teaching as a moral craft indicates that he primarily views teaching as a craft, i.e. as techne. As techne, however, it differs from other crafts because of the normative decisions and the nature of the teacher-student relationship. His arguments for viewing teaching as moral thus differs from the arguments presented in this work, but the conclusion is the same.

That medical care as well as nursing care moral practices is claimed by, among others, Curtin (1979), Kleinman (1986), Robinson (1978, 106), and Silva (1983). Curtin describes nursing in the following way:

> "The end or purpose of nursing is the welfare of other human beings. This end is not a scientific end, but rather a moral end. That is, it involves the seeking of good and it involves our relationship with other human beings. The science that we learn, the technological skills that we develop are both shaped and designed by that moral end - much as an artist uses a brush. Therefore, nursing

> is a moral art. The wise and human application of our knowledge and skills is the moral art of nursing. Nursing science serves this art, and this art would not be possible without nursing science. This art is a moral art because it involves other human beings, our relationship with those human beings and the promotion of what we see mutually as 'good' - health." (Curtin 1979, 2)

Curtin then offers primarily two arguments for conceiving nursing as a moral art: it has a moral end and it involves relationships with human beings. She does not clarify in what respect welfare and health are moral ends or represent the moral good. However, recalling Downie's and Telfer's (1980, ix) view that the concept of health is to be conceived of as a judgment about what kind of life is worth living and how people ought to live, the same can certainly be said about the concept of welfare; thus, welfare and health can be seen as moral ends. In terms of life-forms we can also say that concepts like health, welfare and the educated person all refer to a valuable life-form, to a life worth living, and are thus moral concepts.

The conception of education and health care as moral forms of life can be summarized in the following way.

- Education and health care involve shared meanings, traditions, values, being, relating and acting, and can thus be conceived of as forms of life.
- As forms of life education and health care are part of a larger socio-cultural life-form with which they interact.
- The idea of education and health care is to help individuals to find a life worth living, a valuable life-form.
- Thus, education and health care can be conceived of as moral life-forms.
- As practices, education and health care are part of a moral life form.
- Thus, education and health care can also be coceived of as moral practices.

4.2.2 Categories of practical knowledge in interactive practices

As interactive practices, education and health care have thus been characterized as moral life-forms and moral practices, meaning, that the role of these practices is to pursue valuable life-forms and to help individuals, groups and communities to find a life worth living. And, as far as health care is concerned, it must be added that one task is also to help individuals die when this life comes to an end; or, a better way of conceiving this might be, that the conception of a life worth living includes the conception of dying when the time comes.

Living and acting in these moral life-forms can be described in the same way as living and acting generally: it means participating and creating, it means existing in the three worlds - World 1 or Umwelt, World 2 or Eigenwelt, and World 3 or Mitwelt. It also means acting in terms of inquiring, planning and deciding, and implementing action. Finally it means that knowledge in the interactive practices concerned has the same conditions as knowledge in general: practice constitutes the a priori of knowledge in interactive practices, knowledge is constructed through action, the function of knowledge is to serve as an internal action determinant. This knowledge can be divided into value-knowledge, factual knowledge, and procedural knowledge, which, in turn has articulated as well as unarticulated. elements.

Before these types of knowledge in education and health care are studied, a general characterization of practical educational and caring knowledge must be made.

In the literature reviewed practical knowledge was commonly defined as knowing how, meaning some kind of ability and skill manifested in action but not necessarily formulated,

or even possible to formulate, in concepts and propositions. As was noted in the analysis of knowing how and of the general view of practical knowledge in education and health care, this view tends to be focusing on the "technical", situational and skill-aspect of knowing how. If, however, the concept of knowing how is enlargened so as also to include moral and socio-cultural aspects, it can be used to characterize the concept of practical knowledge as it is conceived in this work.

As an implication of the analysis so far practical knowledge in education and health care can be characterized in the following way.

- Practical knowledge in education and health care means knowing how to educate and knowing how to provide health care.
- Practical knowledge in education and health care is manifested in action on the primary level.
- Practical knowledge in education and health care involves knowing how to use skills and other types of knowledge in interpersonal situations but also moral knowledge about valuable life-forms.
- In its largest sense, then, practical knowledge in these areas means knowing how to participate in a moral life-form.

To these initial characterizations that are derived from the previous analysis a few more - which will also serve as a basis for the forthcoming inquiry - may be added.

- Practical knowledge is always manifested in an action system; this action system may be the acts of individual actors or of a collective.
- As a form of knowledge, knowing how to educate and care must be distinguished from ignorance, i.e. not knowing how to educate and care. While having practical knowledge means acting appropriately or adequately with respect to valuable life-forms, the situation at hand, and the context, practical ignorance means acting improperly or inadequately in these respects.

Thus, practical knowledge in interactive practices can be divided into different categories. On the one hand practical knowledge can be possessed by individuals or by collectives. On the other hand, practical knowledge involves a socio-cultural level and an interpersonal level. (Fig. 4.1)

LEVEL OF KNOWLEDGE	ACTOR: Individual	ACTOR: Collective
Interpersonal	a	c
Socio-cultural	b	d

Figure 4.1 Categories of practical knowledge in interactive practices

The four categories of practical knowledge can be characterized as follows.

a) Individual interpersonal knowledge involves an individual's knowing how with respect to interpersonal relations and situations: it means knowing how to interact with and relate to other individuals.

b) Individual socio-cultural knowledge involves an individual's knowing how with respect to the surrounding life-form: it means knowing how to interact so as to promote and manifest a valuable form of life.

c) Collective interpersonal knowledge involves a collective's knowing how with respect to interpersonal relations and situations.

d) Collective socio-cultural knowledge involves a collective's knowing how with respect to the surrounding life-form.

On the basis of what has been said previously about current literature on practical knowledge in education and health care, we may conclude, that much of the current theories and view can be placed in Category a, individual interpersonal knowledge. This concerns at least Pring (1976, 16-24), Hartnett and Naish (1976, 107-121), Burnard (1987), and Benner (1984), while e.g. Wilenius (1976, 21-38) has a wider conception of practical knowledge.

It should be noted that the distinction between the interpersonal and the socio-cultural level of practical knowledge does not mean that, for instance, a teacher or a health care provider sometimes acts on the interpersonal level and sometimes on the socio-cultural level. The two levels are intertwined with one another in every interactional situation and in every phase of the action sequence, and it is only analytically that we can separate them from one another. The same concerns the two levels of collective practical knowledge.

Collective and individual practical knowledge also tend to be connected to each other, since the individual is always a member of a collective - a professional group, a society, etc. - and utilizes common knowledge and traditions of the collective in developing his own fund of practical knowledge.

Since it may be easier, however, to study practical knowledge with respect to an individual actor, I will divide the study of practical knowledge in interactive practices into individual knowledge and collective knowledge, and start with individual knowledge.

4.3 Individual practical knowledge

Since practical knowledge manifests itself in action, it may be fruitful to continue the investigation into practical knowledge in education and health care by relating it to the action model as it was presented in chapter 2.2.2.

4.3.1 The individual practitioner as an action system

In educating and caring the individual practitioner spends his time in the same circles as we generally spend our lives (fig.4.2), at least according to Pörn (see p.49).

The action model used can be seen as a quite general action and decision model and similar models can be found at least in nursing and in education.

Helen Yura and Mary Walsh, for instance, presented their Nursing Process in 1967. This process describes nursing as a system involving assessing, planning, implementing and evaluating. The four phases are carried through as an interaction between nurse and patient. (Yura & Walsh 1988, ix, 105-183)

Peep Koort (1974, 80-88, 114-118) has presented a model of the educational process that includes planning, teaching, studying, production, product information and evaluating, in which planning also involves acquiring of information, and where the four phases in the middle can be seen as implementation of plans. This model also involves interaction between educator and student.

Katie Eriksson (1979 and 1981) has developed a process of care that in many respects is a synthesis of Yura's & Walsh's and Koort's models.

These models describe the practice as such while the intention here is to describe it as it is manifested in an individual practitioner's action (fig. 4.2).

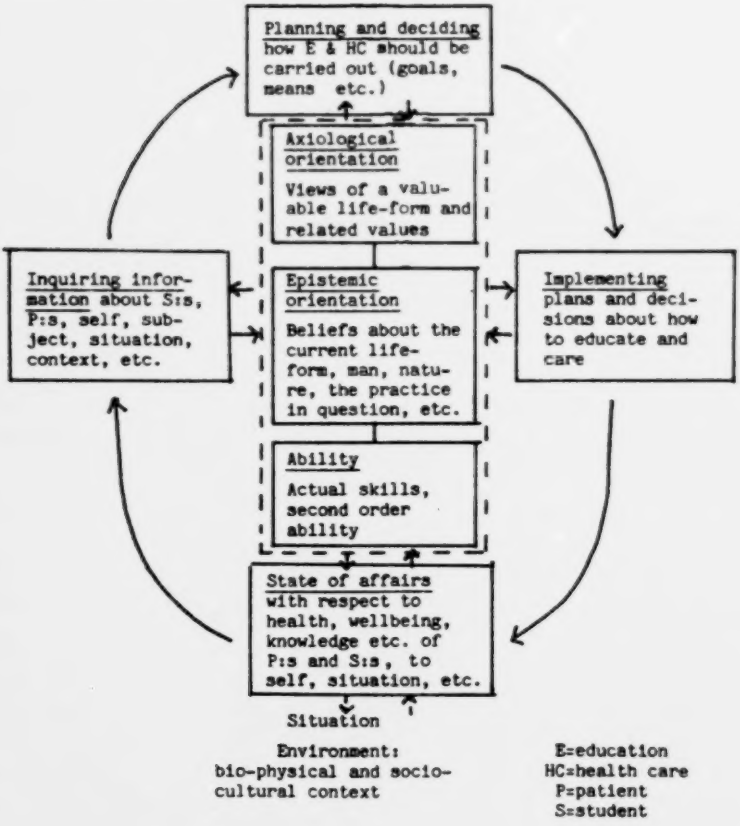

Planning and deciding how E & HC should be carried out (goals, means etc.)
Axiological orientation
Views of a valuable life-form and related values
Inquiring information about S:s, P:s, self, subject, situation, context, etc.
Epistemic orientation
Beliefs about the current life-form, man, nature, the practice in question, etc.
Implementing plans and decisions about how to educate and care
Ability
Actual skills, second order ability
State of affairs with respect to health, wellbeing, knowledge etc. of P:s and S:s, to self, situation, etc.
Situation
Environment: bio-physical and socio-cultural context
E=education
HC=health care
P=patient
S=student

Figure 4.2 The practice of education or health care described as an individual's action system

As distinct from the education and nursing or care models mentioned on the previous page this model includes no spe-

cial phase for evaluation. This phase, however, is included in Inquiring information, because after implementation new information is acquired of the state of affairs which means evaluating.

Moreover, although the phases are presented in a certain order in the model, they can also occur at the same time, or there may be rotations back and forth in the sequence. For instance, during the planning phase a practitioner may become aware of not having enough information, so she goes back and acquires more information before going on with the planning. Or, during implementation a practitioner may notice that the situation has rapidly changed and made the initial plans inappropriate; she must rapidly adjust to the new situation and make new plans - or just improvise. Since each phase represents a distinct sub-activity in the action process, it is also possible to describe each one of them as a sequence of its own.

In any case the connection of practical knowledge to the action system points out some features of practical knowledge:

- Practical knowledge in education and health care is manifested in the whole action sequence: it means acquiring correct information, making the appropriate plans and decisions, implementing the appropriate courses of action, and, after that, acquiring correct information.
- Practical knowledge is a function not only of ability, but also of a system of beliefs and a system of values.

It must be pointed out once again, however, that the actor is not necessarily conceptually and propositionally conscious of all moments, processes and determinants of his own acts.

An example may clarify how the sequence proceeds and how it

is influenced by action determinants.

Example 1

A nurse has a young woman as a patient, who is very depressed after a broken relationship. The nurse has so far met the patient only a few times.

Acquiring information. The nurse has acquired the following information about the patient: she is at the beginning of her professional career, the relationship has been going on for a couple of years but they were neither married nor engaged, the relationship ended because her boyfriend felt he did not want to make any commitments. The patient's parents and two brothers live in a city not far from where she lives herself, she has some good friends among her professional colleagues. In the contacts with the patient the nurse has got the impression of a quite intelligent and ambitious but emotionally unconscious young woman. In addition to information about the patient the nurse also has knowledge of the surrounding life-form: according to the general opinion about a valueble life-form it is valuable to have a permanent relationship and to establish a family, a professional career is also considered valuable provided it does not - if you are a woman - interfere too much with your permanent relationship or your family. Finally, the nurse also has information about herself, her own resources and skills: she has recalled her own experiences and analyzed her knowledge in this area, she has also discerned her abilities and weaknesses when it comes to helping the patient.

Planning and deciding. In planning the next meeting with the patient the nurse tries generally to think of what kind of goal could be pursued in the process. Should the patient accept the situation and concentrate on her professional career? Should she try to mend the relationship by giving the boyfriend more freedom? Should she go out looking for a new friend, be more active socially? And what means and methods should she herself use in order to help the patient? Should she help the patient analyze the reasons for her depression and, maybe, reveal some unresoved conflicts in the past? Or should she just help the patient cope with the present situation and find a way out of it? In thinking about these alternatives the nurse comes to the conclusion that she does not know the patient well enough to make any kind of decisions. She does not know what kind of life the patient considers worth living, and she does not know what the patient wants out of her meetings with the nurse. So she decides to try to talk about these things the next time and to come to some kind of agreement with the patient.

Implementation. When the patient and the nurse meet the next time, the nurse tries to lead the discussion into the areas she has planned. However, she realizes quite quickly that the patient is not yet ready to think about what kind of life she wants to live and what she wants to get out of her meetings with the nurse - other than "feeling better". The patient is still entirely obsessed by the broken relationship. The nurse must instantly abolish her plans and decisions and adjust herself to the present needs of the patient. She gives the patient more time to live out her feelings about the relationship.
Acquiring information (Evaluation). After the meeting the nurse acknowledges that she did not achieve what she had planned during the meeting. However, the patient seemed to feel better after the meeting.

The nurse's internal action determinants can be described as follows.

Axiological orientation. The nurse certainly has a view of what she herself considers as a life worth living for herself, this view is manifested in her way of living and working. When it comes to the patient, she does not want to prescribe how the patient should live and what goals she should pursue; she wants the patient herself to make these decisions. However, this reveals that according to the nurse, one important feature of a valuable life-form is that individuals themselves should be allowed to decide about their goals and lives. Furthermore, when she realizes in the stage of implementation that she cannot implement her plan, she does not force it upon the patient but adjusts herself to the patient. In this, too, she manifests respect for the patient's needs and feelings for the moment. The form of life, then, that the nurse manifests as valuable is one characterized by respect for persons as one important feature.

Epistemic orientation. In acquiring information the nurse is not a tabula rasa. She already has a system of beliefs about the life-form of which she is part and about the rest of the world, about herself, her weaknesses, strengths and abilities. These beliefs she has acquired through previous action sequences in ordinary life-situations, in work-situations and through education. Some of these are ariculated, some not.

Ability. At least, the nurse seems to have the ability to acquire information, and to make plans and decisions. In this she is dependent on cognitive skills like skill in analyzing, thinking and understanding. To the implementation stage she also exhibits ability change her plans and adjust to new situations. This again requires

skill in observing changes in the situation and in perceiving the needs and feelings of another person.

About the external action determinants the following can be said.

Situation. The interactional situation in which the nurse found herself in the implementation stage was not what she had expected and so she changed her course of action, which seemed the appropriate thing to do. However, the fact that she could change her course of action was due to two factors: she was able to perceive the situation, and she was able to adjust her intentions to it. Thus, it was not the situation as such that changed her course of action but her perception of it and her ability to adjust.

Environment. The environment consists of the bio-physical and the socio-cultural context in which both nurse and patient live. The socio-cultural context is the form of life in which they participate. It is in this form of life they both have developed their internal action determinants. The environment also constitutes the frame of reference for their future actions. It is more permanent that the changing action situations.

The question now arises: Did the nurse have practical knowledge? How did her knowledge manifest itself in action? In order to answer these questions we ought to know how the meetings continued. At least in some respects we may say that she exhibited practical knowledge: she was able to acquire a good deal of relevant information and to use this information in the planning phase, she was also able to see gaps in her information and to take these into account when she made her decisions, and, she was able to act appropriately in the implementation phase in spite of the unexpected situation. As a result of this the patient felt better. We might of course say that the nurse ought to have known that it was too soon to start talking about the future, which shows more gaps in her information than she was herself aware of: she ought to have known the patient better. But then again, it is never possible to foresee interaction situations completely: changes in the environment may change the situation,

or the other participants do not react as one has expected. Or, a person may find himself reacting quite unexpectedly in a situation. The ability to deal with changing and unexpected situations can thus be seen as one expression of practical knowledge.

This analysis brings out one feature of practical interaction knowledge, namely that it must always take into account that this knowledge occurs in situations with more than one participant: it involves not only one action system but two or more.

4.3.2 Action systems in interaction and co-action

In the previous example the caring situation was seen only from the viewpoint of the practitioner,and the acquiring of information as well as planning and deciding was seen as stages that preceded the actual interaction concerned. Since educational and caring relationships often stretch over a relatively long period of time, there are periods of direct contact and interaction and periods when the participants are separate. Although the whole process involves interaction between two or several participants, the acquiring of information and the planning and deciding can take place during the periods when the participants are not directly interacting with each other. The direct interaction would then take place in the implementing phase.

In the direct interaction two or several action systems meet. In the interaction they all then go through the phases of acquiring information, planning and deciding, implementing and evaluating.

In addition to being described as an <u>interactional</u> process, i.e. as a process where several participants act in relation to each other, the practices concerned can also be described as <u>co-action</u>, meaning that in education and health care the participants also act together. Viewed as a system

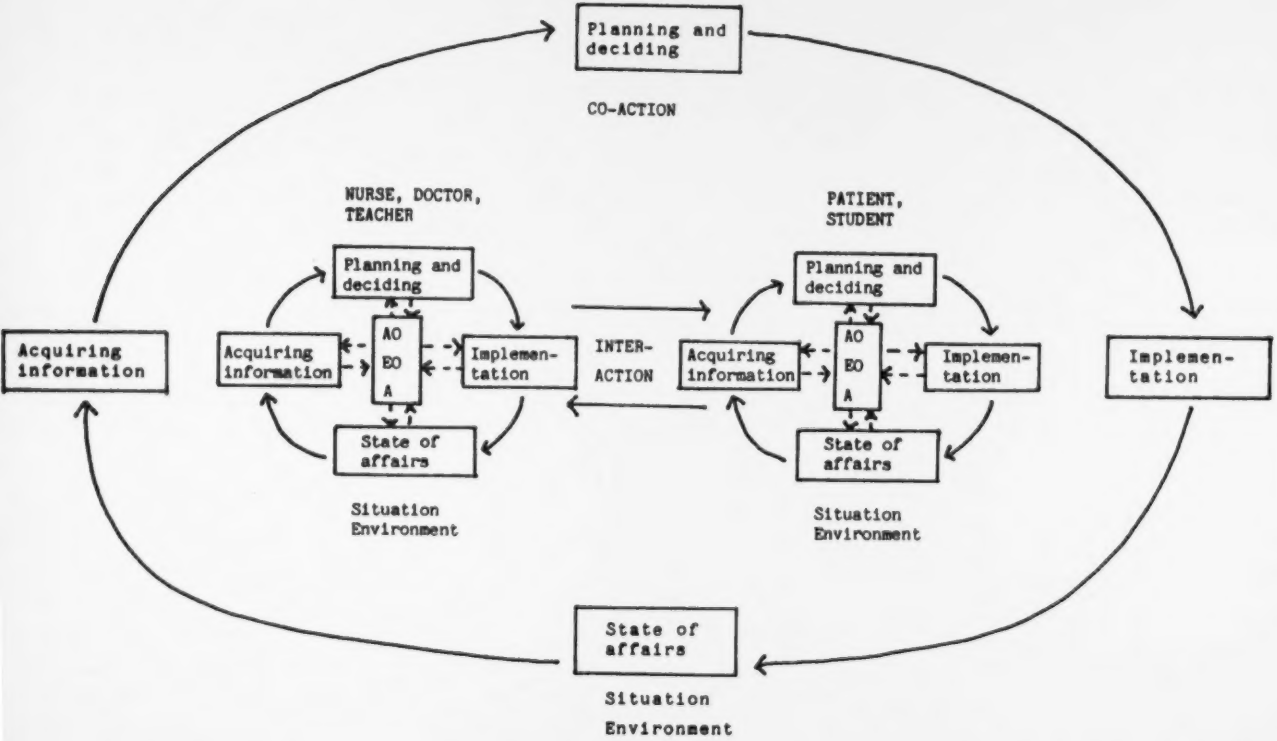


Figure 4.3. Education and health care as interaction and co-action

of co-action, the participants constitute a common action system, going through the action sequence together (fig. 4.3).

Figure 4.3 can be conceived of as a representation of a concrete interaction situation or of a longer sequence of interaction and separation. For the sake of simplicity only one care provider or teacher and one patient or student is included. The figure is only indicative in that it does not specify how the two action systems are related or in which way they make up the united action system. This is not considered necessary for the argument.

The view of education and health care as interaction and co-action calls for a comment on the concepts of self-education and self-care. Self-education has been defined by Koort (1974, 12, 15) as education where the educator and the student are one person. Self-care again has by Orem (1985, 31) been defined as "the production of actions directed to self or to the environment in order to regulate one's functioning in the interest of one's life, integrated functioning, and well-being". In both cases an actor acts in relation to himself - directly or indirectly through the environment. If the care provider/teacher and the patient/student in Figure 4.3. are seen not as two separate individuals but as two positions, we can say that in the case of self-education and self-care, one individual occupies both positions. One actor is then represented by two action systems that are related to each other in a special way. An actor can thus be conceived of as a hierarchy of action systems that act in relation to each other (Pörn 1981 and 1984a; Sarvimäki 1986a; 1986b, 27, 65, 167). That one actor may occupy two positions and act in relation to himself does not exclude the possibility that, in doing this, he also interacts with other actors.

In educational and caring interaction, which involves two or more agents acting in relation to each other (see e.g. Pörn 1977, 78), the agents are united by a special kind of relationship and the whole process can be described as a process of "reading-and-flexing" or "matching in the moment" (Hunt 1977;1983b;1987, 147-148)

The inequality between teacher and student was seen by Tom (p.86)as one of the features of teaching that made it a moral art. Although the line of argument in this work is not consistent with Tom's, reasons can be advanced for a conception of the educational and caring relationship as moral. The reason is: as moral forms of life,education and health care should promote as well as manifest a valuable life-form, which means that the relationship between teacher and student, between care provider and patient, should manifest a valuable life-form. Hence, it is the nature of the practices as part of a moral life-form that makes the relationship moral, and not the nature of the relationship that makes the practice moral.

As a manifestation of a moral life-form the relationship should have an altruistic character. Altruism has been defined by Rescher (1975; see also Sarvimäki 1987c, 148-158) as giving priority to another person's needs and interests and acting for the sake of another person. Adopted to the educational and caring relationship this means that the educator and care provider should give priority to the needs and interests of the students and patients and act for the sake of students and patients. Since the same cannot be required of the students and patients, the relationship is asymmetrical: the tasks and duties of the actor occupying the teacher or care provider position are not the same as those of the actors occupying the student or patient position. The teacher and care provider enters the relationship for the sake of the student or patient and the task, for instance, is to help the student or patient learn or get well. But the student and the patient do not enter the

relationship for the sake of the teacher and care provider, he enters it for his own sake, in order to learn or to get well, for instance. The task of the student is not to help the teacher learn nor is the task of the patient to help the care provider get well, although it is, of course, desirable that the teachers and care providers also learn something in the interaction and develop themselves (see also Sarvimäki 1986b, 78-82).

Knowing how to enter an educational or a caring relationship can thus be seen as one aspect of knowing how to participate in a moral form of life, which has been put forth as one characteristic of practical knowledge in education and health care (p.89). Since the entering of this kind of relationship seems to presuppose an ability to give priority to the interests and needs of another person and the ability to act for the sake of others, this knowledge depends on characterological factors. Practical knowledge that is dependent upon characterological factors again according to Hartnett and Naish (1976, 116), is acquired by developing a disposition and it belongs to that area of practical knowledge which is not expressible in propositions. This argument can be extended to the whole moral aspect of practical knowledge, meaning that knowing how to participate in a moral form of life is dependent on characterological factors. And moreover: since practical knowledge in its fullest sense was conceived of as participating in a moral life-form, practical knowledge in its fullest sense becomes dependent on characterological factors.

However, the moral-characterological knowledge cannot be considered sufficient for practical knowledge in interaction and co-action. Knowing how to interact and co-act also involves knowing how to "read" an interactional situation and to "flex", i.e. adjust your own intentions according to the situation; it involves "matching in the moment":

> "I think the most important part of good teaching is that uniquely human part which teachers bring to the classroom transaction which could not be programmed in advance or carried out by a computer. Part of what teachers do can be considered to be processing information (or acting as computers), and this is not unimportant, yet it is what cannot be pre-programmed that makes for the skilled teaching performance. Put another way, I think that one of the most distinct features of an excellent teaching session is that it could not have been completely planned (or programmed) in advance. Teachers' responsiveness 'in the moment' to unanticipated happenings in the classroom is not just something extra that they add; it is the essential ingredient of a skilled performance." (Hunt 1983b)

The process of "reading and flexing" involves according to Hunt (1983b;1987, 147):

1. Skill in "reading"
   a. Obtaining feedback
   b. Perceiving and interpreting students and situation
2. Skill in "flexing"
   a. Modifying intention on the basis of new perception
   b. Translating perception and intention into action
   c. Skill in action.

And since there are two or more participants reading and flexing in the teaching situation, teacher and student, the process can be described as an interpersonal transaction (fig.4.4).

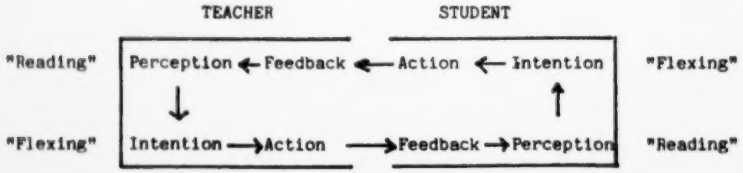


Figure 4.4 The teaching situation as an interpersonal transaction (Hunt 1987, 147)

According to Hunt (1987, 147-148), any interpersonal transaction can be described by means of the model in figure 4.4. However, in most interpersonal transaction, he claims, the participants are neither aware of perception nor intention, which means that the circle goes from one participant's feedback directly to action and then to the other participant's feedback and directly to action. When teachers are given the opportunity to reflect on their actions, they become aware of the implicit theory "behind" their action, uniting perception, intention and action.

Since the model in figure 4.4. is supposed to cover all kinds of interpersonal transactions, we can assume that it is equally applicable to health care interaction as to teaching. The model in figure 4.3 resembles Hunt's model, although the phases are named differently and the co-action aspect is not explicit in Hunt's model. In a direct interaction 'acquiring information' corresponds to perception, 'planning and deciding' to intention, 'implementation' to action, and the next phase of 'acquiring information' (i.e. evaluation) to feedback. The implicit theory would then refer to factors among the internal action determinants; this line of thought will be brought up a little later.

Hunt's model can be used in the same way as the main models used in this work (fig.4.2 and 4.3) to describe and analyze a concrete, direct interaction situation or an interactive practice, extending over a longer period of time. In both cases the process is described as creative in the sense that the word was used when living was characterized as a creative process (p.42), meaning that in education and and health care it is seldom possible to fix a definitive goal beforehand and implement a fixed plan. The educator and the care provider must continually "read" the changing situations and the reactions of the participants, they must be prepared to alter the goals as well as the plans.

This process corresponds to what Harrison (1978, 13, 136-143; see also this work p.21) describes as designing while making: it is a process of continuous planning and revision of goals as well as implementation. It is thus different from the simple making, technical activity, which only involves implementation of fixed goals and plans (see also Collingwood 1960, 15).

As part of the creative process of living, educating and caring can also be conceived of as creative practices and creative interaction, where the participants - educators as well as students, care providers as well as patients - are involved in a continuous process of planning and implementing, reading and flexing (see also Sarvimäki 1986a and 1986b). The creative nature of life, man and nursing has also been described by Martha Rogers (1970) in her own original way. Wilenius (1976, 24-25) points out the creative nature of education, referring to Merikallio-Nyberg 1974, 15), who sees the continuous changing and modification of intention as a criterion of creative processes; she thus stresses the "flexing" nature of creative processes.

Practical knowledge in educational and caring interaction thus involves moral knowledge, creativity, and interpersonal skills like reading situations and participants and modifying intentions. Moral knowledge as well as interpersonal skills seem to require two more kinds of knowledge: knowing the other participants, and knowing oneself. If the teacher does not know the students, and if the nurse does not know the patient, it is difficult for him to give priority to the student's or patient's needs and interests and to perceive reactions and interpret them correctly. This implies self-knowledge if the teacher or nurse is to be able to distinguish between his own needs and interests and the student's or patient's,and if he is to refrain from imposing his own reactions on the other in perceiving him. He also needs self-knowledge in order to reflect upon his action and change his intentions.

F.M. Berenson has developed interesting lines of thought about what it means to know another person. He says:

> "To know any person is to know him through acquaintance, by confrontation and this involves having the concept of persons, understanding what sort of things persons are, what relations are appropriate to the sort of things persons are and so on.(Berenson 1981, 21)."

He then goes on to show that understanding of persons is situational: it involves persons in situations. It is also emotional and relational: it requires some kind of emotional relationship to the person known - it is, so to speak, through emotions that we come to know persons, not through knowing them that we come to feel something for them. Further, knowing another person is always personal: it involves a personal relationship with the other person. Understanding another person is also a creative process: it involves mutuality, communication and reciprocity. Knowing a person is then different from scientific, objective knowledge, which, according to Berenson, is not personal. We can also have scientific knowledge about a person but then the personal, emotional relationship is lacking and it is not the same type of knowledge as knowing the person. (Berenson 1981, 21, 85-86, 105-106, 127-132, 185-186)

Understanding persons seems, in Berenson's view, to correspond to Carper's (1978) esthetic and personal knowledge, and to the type of knowledge that has been referred to previously in this work (p.54) as familiarity and knowledge by acquaintance. However, if it involves the concept of persons, as Berenson claims, it also seems to require a conceptual component, unless we assume some kind of implicit concepts. And, finally, it also seems to involve a moral aspect: understanding what sorts of relations are appropriate to persons. Understanding a person is thus a very complex kind of knowledge, involving a personal, moral and emotional relationship, creativity, confrontation, and situational understanding.

Much of what can be said about understanding persons can also be said about self-knowledge. Self-knowledge is acquired in confrontation with others as well as with oneself, it is knowledge of oneself in different action situations and involves an emotional relationship with oneself. It means being familiar with oneself as an acting person.

Knowing how to educate and care involves in a very fundamental way knowing how to interact and co-act with other actors so as to promote and manifest a valuable form of life. This knowing includes knowing how to establish and maintain an altruistic relationship, knowing the situation, knowing the other participants, knowing oneself, and knowing how to "read" and "flex" in the interactional situation. All this involves moral and characterological aspects as well as a set of skills. As co-action education and health care require not only knowing how to act in relation to other actors but also knowing how to coordinate action so as to achieve a common goal. Tuomela (1983, 77-81) uses the concept 'We-intention' to characterize this type of social action and Hellgren (1985) has adopted Tuomela's terminology in defending the thesis that teaching is a social concept. Interaction and co-action are not to be seen as two entirely separate forms of social action. We could say that all co-action involves interaction but all interaction is not co-action. It is only when interaction is coordinated so as to achieve a common goal - or when the individual intentions are subordinated under a we-intention - that it becomes co-action. Thus, knowing how to co-act, in addition to the interactional knowing how mentioned previlously, involves knowing how to form a we-intention and knowing how to coordinate action.

The treatise of interactional and co-actional knowledge in this chapter has primarily referred to the interaction and co-action between teacher and student, care provider and patient. However, since both education and health care are to a large extent team work, the thoughts concerning inter-

actional and co-actional knowledge presented here can also be applied to interaction between care providers and the patient's family, between team memebers and between colleagues.

4.3.3 The complexity of interactional knowing how

Interaction situations in education and health care can be very complex and require a broad range of interactional knowing how. Different aspects of the interactional situation require different kinds of knowing, all unified into coherent action.

The different aspects of the interactional situation can be understood in terms of a modification of Habermas' action theory. As was noted previously, Habermas connects the conception of knowledge to interests, and by interests we should understand action interests. According to the theory of knowledge and interest (Habermas 1966 and 1975; Lesche & Madsen 1976, 21-24) there are three media by which society is maintained: work, language and authority. By 'work' is meant different kinds of action by means of which man controls causal processes and regularities - both bio-physical and psycho-social - in order to reach an adjustment between man and nature. Thus, while work is the medium for control of objectified processes, language is the medium for transmission of shared meanings and traditions, and authority is the medium for maintaining social and political power. The three media correspond to the three knowledge interests: the technical, the practical or hermeneutic and the emancipatory. In other works Habermas (1974, 1-40;1981, 384-387, 394-395;1984) divides work into instrumental action, by which he means result-oriented action in non-social situations and strategic action, by which he means result-oriented action in social situations; by instrumental action, then, man controls physical processes and by strategic action social processes. A third type of action, according to this

classification, is communicative action, which is a form of social interaction oriented to the reaching of understanding; it involves the recognition of norms and common meanings, as well as the coordination of intentions and action and it does not always include speech acts. The crucial difference between strategic interaction and communicative interaction is that the former aims at controlling the other participant's action while the latter aims at mutual understanding and coordinated action. The emancipatory knowledge interest, according to Habermas, is on a more overreaching level than the technical and the practical-hermeneutic. Accordingly, there is no special kind of action corresponding to this interest. Rather, it corresponds to self-reflection and discourse, meaning, in a way, that man for a while refrains from acting and instead analyzes action. Through this process he becomes aware of distorted forms of communication and consciousness and can return to action with an emancipated consciousness.

That Habermas' theory of knowledge has been criticized was noted previously (p.36) and this is true also for his theory of action - they are, after all, closely connected. Kangas (1987, 16) mentions for instance that it must be doubted whether self-reflection and discourse can be conceived of as social and political. In clarifying the process of self-reflection and discourse Habermas used the psychoanalytic process as an analogy. Kangas questions this analogy and concludes that self-reflection and discourse are more appropriate in a therapeutic, individual context than on the social and political level. Skirbekk (1987) on the other hand criticizes Habermas' limited conception of the relationship between man and nature. He also points out that Habermas, in his more recent theory of action, seems to have abandoned the knowledge-constitutive interests as they appear in his earlier writings.

Although Habermas' theory of action is not free from cri-

ticism, it can be considered as suggestive of ideas. Thus, attempts have been made to apply his ideas to education and health care.

Olle Hellström (1985a;1985b;1985c)has adopted Habermas' theory of knowledge and action to general practice and primary care. He focuses on communicative action and the doctor-patient relationship, emphasizing mutual understanding, interpretation of the patient in his total life situation, self-reflection.

Merry Scheel (1985, 136-141) characterizes nursing as an interactional practice involving three aspects: an instrumental aspect, an expressive-communicative aspect, and an emancipatory aspect. In her interpretation the instrumental aspect includes instrumental as well as strategic action. In nursing interaction the three aspects are integrated into a unified whole.

Scheel does not give priority to any one aspect and does not see them hierarchially ordered. This would, however, be a possibility (see Sarvimäki 1986a;1986b, 140-144;1987a;1988). Education and health care, for instance, could then be conceived as primarily communicative interaction including instrumental and strategic as well as self-reflective and discursive aspects.

In order to clarify the complexity of interactional knowledge in education and health care an adaptation of a model presented by Kangas (1987, 20) and Skirbekk (1987, 51) can be used. According to the model Habermas distinguishes between three areas of reality (external nature, society, and internal nature) and three types of relationship to reality (objectifying, norm-conforming, and expressive). Each relationship involves a special type of rationality (objectifying = instrumental-strategical, norm-conforming = moral-practical, expressive = esthetic- practical). Kangas and Skirbekk differ somewhat in their views of possible

combinations of areas of reality and relations but it is not necessary to go into that discussion here. As was noted previously, discourse or self-reflection, is seen as an activity "outside" or "above" the others (Habermas 1974, 18-28; Kangas 1987, 23-26), which means that it is not included in the scheme. It is, in a way, a kind of communication but on another level. Its function is to question and criticize the assumptions inherent in the other types of rationality and action.

The three areas of reality correspond closely to the three worlds discussed previously (e.g. pp.41-42, 88). The relationships between areas of reality, or life worlds, rationality and types of action thus form a complex scheme (table 4.1)

	AREAS OF REALITY			
RELATION	External nature World 1 Umwelt	Society World 3 Mitwelt	Internal nature World 2 Eigenwelt	ACTION
Objectfying	Instrumental-strategic rationality			Instrumental, Strategic ← DISCOURSE
Norm-conforming	Moral-practical rationality			Communicative ← DISCOURSE
Expressive	Esthetic-practical rationality			Expressive ← DISCOURSE

Table 4.1 Types of action with respect to rationality and relations to areas of reality

In adopting this model to educational and caring interaction the following points of departure may be brought to mind. Firstly, that education as well as health care involves all three worlds, i.e. all areas of reality. Secondly, that education and health care have been characterized as mainly moral forms of life. Since moral-practical rationality is the rationality of communicative action, education and health care can be seen as primarily communicative action.

As communicative practices they should build on what Habermas (1981, 385, 394-395) calls a communicative attitude: the participants do not try to control each other but to understand each other, to reach an agreement and to coordinate their action. This could be seen as some kind of "meta-situation" in education and health care meaning that it has to do with the moral-practical nature of the practices, although singular, concrete interaction situations may appear different.

Concrete interaction situation in education and health care may be very different from each other. In a psychoanalytic situation, for instance, the discoursive, self-reflective aspect is very dominant; indeed, it is used as a paradigm case of discourse (see e.g. Habermas 1975, 9). An operation, on the other hand, where the patient is under anesthesia, places a strong emphasis on instrumental aspects. And in education the emphasis may sometimes be on communicative aspects, that is, on transmission and interpretation of meanings, and sometimes on discoursive aspects, that is, on questioning and reflecting. Furthermore,art therapy seems to have a strong expressive aspect, while e.g. behaviour therapy is more strategic. However, the model in figure 4.5 is not mainly intended as an instrument for classifying varying types of interaction situation. Rather, since most interaction situations in education and health care include a combination of interactive aspects, it should rather be conceived of as an instrument for analysing different aspects of interaction. In all education and health care, however, these aspects are aspects of a moral-communicative practice and all the situations mentioned here are ultimately communicative. The patient on the operation table, for instance, is not just an organism or a bunch of physiological processes. Even though he is under anesthesia, he is a social person with a right to be treated with respect and dignity. And before he has reached this stage of medical care, he has probably been involved in a series of contacts

and consultations and agreed to the operation.

Scheel's (1985, 139) picture of nursing as interaction with an instrumental-strategical, an expressive-communicative and an emancipatory aspect can now be differentiated. Health care as well as education can thus be pictured as primarily moral-communicative practices with five interactional aspects: an instrumental (interventions into bio-physical processes), strategic (controlling the action of a subject), communicative (transmitting and interpreting symbols of meaning, mutual coordination and understanding), expressive (expressing thoughts and feelings), and discoursive (self-reflection, questioning and criticizing action). These five aspects involve five aspects of knowing how in educational and caring interaction, also including the three worlds in which this knowing and acting occurs (fig.4.5).

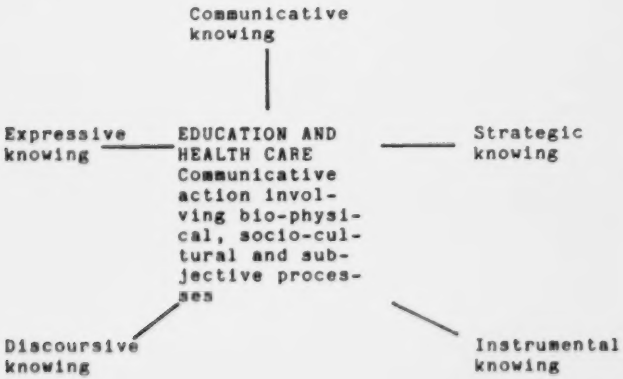


Figure 4.5 Aspects of interactional knowing in education and health care

Interaction and co-action in education and health care, as it has been described in section 4.3.2, thus involves dif-

ferent aspects, each one involving a specific type of knowing. These aspects are integrated by moral-communicative knowledge into practical knowledge in education and health care.

Some examples may clarify the aspects of interactional knowledge in the practices concerned.

Example 2

A young teacher - not yet very experienced - is teaching a history class on a subject he himself finds very important. His class consists of 28 pupils, around 14 years of age. Some of the pupils are interested in the subject - they listen actively and ask questions - and some seem more or less uninterested. One group, consisting of five pupils, acts very disrutbilngly;the pupils talk and laugh and do not take any notice of him whatsoever. The teacher first tries to ignore them, he goes on talking and discussing just raising his voice a little. However, the noise continues and the rest of the pupils seem overtly disturbed and uneasy. At this point the teacher decides that he must do something to restore order so that the lesson can go on. Three alternatives cross his mind. 1. He could raise his voice even more but beside that ignore the disturbing group. This, he figures, would do no good, because this is what he has been doing now and it has not helped. 2. He might tell the disturbing pupils to leave the class. This again might make the pupils concerned aggressive against him and he feels he is not yet ready to deal with an open conflict. He knows that two of the pupils in the disturbing group are leading figures in the class and they might turn the whole class against him. 3. He might divide the class into smaller groups and give every group a task to work on for a while. If he succeeds in this, he will reach his goal: order will be restored and the lesson can go on. But this alternative also keeps the class together and the disturbing students will get a chance to learn. 4. He might ask the disturbing pupils what is going on and then ask them to be quiet. This, he figures, might not be effective, because if they are asked to be quiet they might just want to show that he can not control them. He settles for alternative 3.and this time attains his goal.

This educational situation can be described and analyzed by means of the concepts and models used so far.
A. It can be conceived of as a transactional situation, involving 29 participants "reading" and "flexing". Here

the focus has been on the teacher.
B. The situation can also be described as an action sequence in terms of acquiring information (about the situation in the class), planning and deciding (goal = restored order, strategies 1-4, decision = alternative 3), implementing (implementing alternative 3) and evaluation (order restored, lesson continues).
C. In this situation the teacher exhibited practical knowledge in interaction in the form of strategic knowledge: he had a definite goal in mind and he managed to choose and implement the appropriate strategy. His knowledge of the situation, of the pupils, and of himself was a prerequisite for acting appropriately.
D. The teacher's choice of strategy in this situation was part of his moral-communicative knowledge. His sole intention was not to make the pupils concerned keep quiet but his main concern was to keep up a communicative relationship and involve them in the learning situation.
Needless to say, in some other situation, in another group, for another teacher alternative 1, 2 or 4 might have been appropriate.
The knowledge the teacher exhibited in this situation may not have been conscious in all respects.

Example 3

An elderly woman has been brought to the emergency ward with a wound in her foot. She has been working in her garden, where she stepped on a rusty nail. Now she is very restless and upset and in pain. She thinks that the wound is infected and is afraid that they will amputate her foot.
At the ward she is taken care of by a nurse and a doctor. They examine the wound and ask her about the accident. While the nurse cleans the wound the doctor comforts the patient. He tells her that there is no need to worry; the wound is not very deep. They will just clean it, put in a few stitches and give her a tetanus injection. If she wants, they can also give her something for the pain. As the doctor sews the wound the nurse holds the patient's hand, talks calmingly to her and asks her how she feels. After the treatment the doctor reassures her that everything went fine and that she will soon be able to work in the garden again. The nurse discusses with her how she can manage when she gets home and asks her if she needs any help at home, in which case they could contact a social worker. The patient says that she lives with her sister and that they will manage just fine. Finally the nurse and the patient decide when she is to come back to remove the stitches and the nurse tells her to call if anything occurs.

This situation too can be described and analyzed in terms of previous concepts and models.
A. The doctor and nurse are both "reading" and "flexing". They perceive the patient's distress and reactions as well as the wound and adjust their own intentions and actions. They also perceive each other and coordinate their action; apparently this doctor and nurse have worked together in similar situations before, since they do not seem to need much words in order to cooperate. They are acquainted with each other and with this kind of situation.
B. The nurse and the doctor can also be described in terms of two action systems or, in this case, as one action system with a we-intention, going through the phases of acquiring information, planning and deciding, implementing and evaluating.
C. In this situation both care providers exhibit practical knowledge in interaction in form of primarily instrumental and expressive knowing how. The nurse managed to clean the wound and give the injection and the doctor managed to put in the stitches. Both exhibited expressive knowing in that they were able to express their concern for the distressed patient in words and action (comforting, taking an interest in how she will manage at home).
D. Both care providers also exhibited moral-communicative knowledge. The whole situation aimed at helping the patient and at doing it in such a way that it could be conceived of as an example of a valuable form of life.

The care providers in this example thus exhibited practical knowledge in that they acted appropriately instrumentally and expressively as well as moral-communicatively. Prerequisites for their practical knowledge was their acquaintance with this type of situation and with each other, their knowledge of wounds and their treatment, knowledge of the used drugs and their effects, and skills in implementing the chosen acts.

According to the categorization of practical knowledge in individual and collective, socio-cultural and interpersonal, it should also be possible to find a socio-cultural and interpersonal level in the practical knowledge of these individual practitioners. The socio-cultural level should reveal something about the relationship of these actions and the conception of a good society. The teacher's socio-cultural knowledge is manifested, for instance, in stressing historical knowledge as important for the pupils; we may assume he thinks it is important because it helps the pupils understand their own historical time. His choice of strategy also has a socio-cultural level. It can be seen as a manifestation of a non-authoritarian, co-operative view of human relations in society as well as in education. The interpersonal level of the teacher's knowledge is manifested in his way of dealing with the concrete situation in the

classroom, in his knowing how to involve all pupils in the learning situation.
The socio-cultural level of the practical knowledge of the care providers can be seen, for instance, in the nurse's interest in the patient's home situation. We may assume that her conception of a good society is that it is one where people can be helped and assisted if they cannot manage on their own and that there is some authority they can contact in case of emergency.
The interpersonal level of knowing is manifested in the care providers' appropriateness of action with respect to the concrete interactional situation.

The analysis of the knowledge of individual practitioners in educational and caring interaction shows how complicated practical knowledge is, involving a complex whole of action sequences, transactions, interactional levels and aspects.

What has so far been discerned about what it means to have practical knowledge can be summarized as follows.

- Practical knowledge in education and health care means knowing how to educate and care.
- Knowing how to educate and care means knowing how to participate in a moral form of life.
- Knowing how to participate in a moral form of life means promoting and manifesting a valuable life-form.
- Knowing how to promote and manifest a valuable life-form means acting appropriately in educational and caring situations.
- Acting appropriately in educational and caring situations means knowing how to interact instrumentally, strategically, communicatively, expressively and discoursively.
- Knowing how to interact with respect to the different interactional aspects means knowing how to "read" (feedback, perception) and "flex" (intention, action) in an interactional situation.
- Knowing how to "read" and "flex" can also be described as acquiring correct information (knowing

oneself, knowing the other participants, knowing the situation), making appropriate plans and decisions, implementing appropriately, and acquiring correct information in the evaluation phase.

The characterization can be said to concern the manifestation of practical knowledge: acting appropriately, with all that is involved in it, is a manifestation of practical knowledge while acting inappropriately is a manifestation of practical ignorance. This means that practical knowledge must also be characterized in some other way - as that of which the appropriate action is a manifestation.

According to the action model used in this work action is determined by three types of internal action determinants: axiological orientation, epistemic orientation and ability. All action is thus a manifestation of a set of internal action determinants. That action is a manifestation of these internal determinants means that they are implicit in action whether the actor is explicitly aware of them or not.

An actor's internal action determinats can constitute systems of knowledge or systems of ignorance. When acting appropriately, an actor manifests systems of knowledge: value-knowledge, factual knowledge, and procedural knowledge. Since the actor need not be conceptually aware of this knowledge, he may, in his action, manifest knowledge that he cannot express in words. That an actor is not aware of all the knowledge he possesses is something that has also been pointed out by e.g. Bergson (1911, 11-13), who says that only a part of the action dispositions that we form - which also include our character - turn into ideas, and by Hartnett and Naish (1976, 114), who say that we may know far more than we can tell.

A remark on the difference between manifesting knowledge and applying may be appropriate here. In manifesting knowledge in action, action is the way in which the actor knows something and this may be the only way he knows this. In applying knowledge in action the actor must first know what he knows in some other way and then try to make this knowledge inform his action. The relationship between manifesting and applying will be discussed later. The intention in drawing attention to this difference here is only to make it clear that manifesting an axiological and epistemic orientation and an ability is not the same as applying.

4.3.4 Practical knowledge as a manifestation of the actor's axiological orientation, epistemic orientation and ability

If a teacher or care provider acts appropriately in different action situations within his practice he has practical knowledge, which, in turn, indicates that he has the value-knowledge, factual knowledge, and ability required for the practice. Using v.Wright's (1963, 49) criteria of knowing how we could add that he must act appropriately on most occasions in order to be described as having practical knowledge. Actually, practical knowledge can probably be graded as more or less complete: a practitioner who always acts appropriately, despite unpredictable changes in situation, has complete practical knowledge, while a practitioner who always acts inappropriately has no practical knowledge.

If a practitioner acts inappropriately it can be a manifestation of value-ignorance, factual ignorance or inability, or it may be a manifestation of a combination of these or of incapacity to integrate them into an action sequence.

The axiological and epistemic orientation of an action sys-

tem can be clarified by using Joseph Royce's and Arnold Powell's theory of personality as an aid. Their theory is, as a whole, very extensive and elaborated and it is neither possible nor necessary to go into every detail. Their main model, however, is useful for the purpose of this study.

Royce and Powell (1983, 3-17) view the individual as a proactive, goal-seeking system. Personality is an integrative, hierarcical system that organizes the various subsystems. The lowest level in the hierarchy consists of a sensory system that transduces physical energy into psychological information and a motor system that transduces psychological information into physical energy. The next hierarchical level consists of cognition, i.e. the transformation of psychological information in order to identify environmental invariants, and of affect, i.e. transformation of psychological information into optimal arousal states. On the third level of personality is the style-system that integrates and modulates information by particular modes of processing and the value-system that integrates and modulates information to achieve specifiable goals. The highest level is the integrative personality, which optimizes personal meaning by establishing a satisfactory life style, evolving an adequate world view, and maintaining acceptable self-images. All these systems and sub-systems interact in complicated ways. Mainly, though, the world view is founded in the cognitive system, which includes the sensory system, cognition and the style system, while life style is founded in the motor, affect and value systems.

Generally, then, the cognitive system can be said to process information into beliefs. Thus it corresponds to what has been called epistemic orientation in the model used in this work. The role of the motor, affect and value system can generally be said to direct action and correspond to

the axiological system in the model used here. It must be remembered, however, that there is an interplay between all systems in establishing beliefs as well as in directing action. Since Royce's and Powell's model is a model of personality, it does not include the ability system which is part of the more general action model in this work.

4.3.4.1 Axiological orientation

Within the context of Royce's and Powell's personality theory the motor system, the affects and the values form a hierarchy from an organically based to an abstract axiological orientation; this hierarchy also describes in which order the systems develop (Royce & Powell 1983, 244-248).

An abstract value system is then supposed to be an important axiological system in an adult practitioner's internal action determinants.

Values can be described as relatively independent human constructs. In their collective form they are part of World 3, in their personal, individual form they belong to World 2. The function of values is to direct action. Since they indicate what is good and desirable or bad and avoidable their role is to orient the action system toward what is good and turn it away from what is bad. An actor can express his values in mainly two ways: action and speech. Values can then be manifested in action - and ultimately in a life style - and they can be used to defend or criticize actions and life styles. Values can be classified in a variety of ways depending on what the point of departure for classification is. (Hirsjärvi 1975, 16-21, 32-39; Niiniluoto 1984, 318-327; Rescher 1976)

Depending on who will be the beneficiary, Rescher (1976)

distinguishes between two main types of values: egocentric or selfish values and altruistic or unselfish values. The altruistic values can extend to a larger or smaller group (e.g. relatives, professional groups, society) or to mankind.

On the basis of their investigations Royce and Powell (1983, 146) hypothesize that there are three main factors in the value domain: intrinsic, self and social:

> "These three higher-order values reflect basic orientations toward what is important to understand cognitively and react to emotionally in the world. The emphasis here is on specific informational content (styles emphasize processing mode). As such, these basic value orientations select for specific kinds of precepts, concepts, and symbols, as well as specific affective reactions. In other words, individuals have basic value commitments that specify what is worth knowing about the world, and which aspects of the world one should react to with feeling." (Royce & Powell 1983, 146)

An individual with an intrinsic value orientation tries to develop excellency in some area or to achieve goals that are intellectually or physically challenging. An individual who is committed to self values tries to maintain his own unique individuality and independence. A social value commitment means that the individual has other people as the point of departure for his orientation. (Royce & Powell 1983, 146-147)

There are, according to Royce and Powell (1983, 207-209), three life styles that correspond to the three value orientations: icarism, individualism, and altruism. An individual with an icaristic life style commits himself to intrinsic values: what is worth living and dying for is mastery in some respect. An individualistic life style means that the individual commits himself to self-actualization, and an altruistic life style manifests itself in dedication to the welfare of others.

Usually an individual possesses all three types of values but the different factors may be more or less dominating. Since education and health care have been characterized as moral forms of life based on an altruistic relationship (pp.101-102), we may conclude that social, altruistic values play an important part in these practices. These values direct the practitioner's interest toward other human beings: it is important to understand other persons and to react to them with feeling. This does not exclude the other value factors. The self values direct the practitioner's interest toward himself, helping him to acquire self-knowledge, to develop himself, and preserve his independence. Intrinsic values again can direct the practitioner's interest toward the subject of teaching, toward the development of new knowledge, science and research. Social values are, however, inspite of it all, the crucial factor in the educational and caring practices.

Practical knowledge, manifesting itself in appropriate action, is a manifestation of value-knowledge. In education and health care this value knowledge is to a large extent moral. Practical knowledge in these areas is a manifestation of moral knowledge, meaning that the practitioner manifests social, altruistic values in her action. Moral knowledge can thus be said to be a necessary but not sufficient ingredient in practical knowledge in education and health care.

The concepts of value and value system have been considered here as central in characterizing value-knowledge and axiological orientation. There are other concepts, related to the value-concepts, that can also be used in describing an axiological orientation, e.g. 'ideal' and 'principle'. An ideal consists of a set of positive values in combination with some aspect of reality. Thus, an actor's axiological orientation may include e.g. ideals of man, society, and the world. These ideals manifest themselves in the goals of the practice concerned, which could be seen in the

analysis of the goals of health care and education (pp. 81-82). An axiological orientation also includes action principles, i.e. prescriptions about how to act or not to act in order to realize and manifest the accepted values and ideals.

Practical knowledge as manifestation of value-knowledge thus includes manifestation of values as well as ideals and principles, which, in the cases of education and health care, principally are part of an altruistic orientation.

4.3.4.2 Epistemic orientation

While value-knowledge has to do with possessing appropriate values, ideals and principles, factual knowledge has to do with possessing correct information, or correct beliefs, about the world. This knowledge is practical when manifested in action.

The system that processes information into beliefs - and ultimately into a world view - is the one Royce and Powell (1983, 15) call the cognitive system. In the action model used in this work acquiring information is seen as one of the phases of an action sequence. Since every phase is an action sequence of its own, acquiring information is an active process, which in turn is influenced by an axiological orientation, an epistemic orientation and ability. Furthermore, every other phase in the action sequence also involves acquiring information. There is, then, a continuous interaction between acquiring information and acting, which can be seen in Royce's and Powell's (1983, 13) model and which is also emphasized by e.g. Ulric Neisser (1982, 19-27). This interaction also includes interaction between the axiological and the epistemic orientation. According to Anna-Liisa and Jarkko Leino (Leino & Leino 1982, 7-11; Leino 1987, 1-9), the conception of man as an in-

formation processing, knowing and acting being, where thought and feeling are integrated into a functioning whole, is dominant in the so called cognitive psychology.

Although the cognitive systems - sensory systems, cognition, style - are influenced by motoric and affective as well as value processes, according to Royce and Powell (1983, 108-121, 134-143), they are also characterized by factors of their own. Cognition includes three factors: perceiving, conceptualizing and symbolizing. Perceiving has to do with the organization of directly perceptible qualities of objects, while conceptualizing has to do with verbal comprehension and reasoning. Symbolizing, finally, has to do with representing numbers of objects or ideas in one single form and with the creation of cultural forms, articulated e.g. in products of art. Depending on which factor is the strongest in an individual's cognition three cognitive types can be discerned: the perceiving type, the conceptualizing type and the symbolizing type. The three cognitive factors give rise to three epistemologies: empiricism, rationalism and metaphorism. These constitute the discriminating factors in the style system and are described as three different ways in which cognition and affect are integrated:

> "Empirical styles involve a commitment to relating to the world through one's senses and to testing one's ideas about reality in terms of reliability and validity of observations. Affectively, there is a commitment to the arousal that comes via immediate experience.
> /.../
> Rational styles involve a commitment to relating to the world through one's rational/analytical skills and to testing one's ideas about reality in terms of logical consistency. Affectively, there is a commitment to remaining aloof from the arousal effects of the immediate environment.
> /.../
> Metaphoric styles involve a commitment to symbolic-metaphoric experience and to testing one's ideas or awareness about reality in terms of their universality (i.e., to constructing cognitive representations of experience that have the great-

est degree of generality)." (Royce & Powell 1983, 135)

Royce and Powell (1983, 191-196) use the terms empirical, rational and metaphorical to refer to three overreaching epistemic styles or ways of knowing. These ways of knowing represent three ways of approaching reality and this can be seen in individual life styles and world views as well as in different disciplines of knowledge. Science, for instance, represents a combination of rationalism and empiricism, art represents metaphorism, and religion represents a combination of metaphorism and rationalism. Since the three ways of knowing work on a very overreaching level, they include a variety of epistemological characteristics. Royce and Powell combine each epistemic style with a specific relevant cognitive ability and a specific truth criterion (table 4.2).

EPISTEMIC STYLES	RELEVANT COGNITIVE ABILITIES	TRUTH CRITERIA
Empirical	Perceiving	Perception-misperception
Rational	Conceptualizing	Logical-illogical
Metaphorical	Symbolizing	Universal-idiosyncratic

Table 4.2 Interaction between style and cognition in the three ways of knowing (Royce & Powell 1983, 191)

Royce's and Powell's theory of epistemic styles has been further developed and investigated in Canada by Richard Rancourt and his associates (Niday 1987; Noble & Rancourt 1987; Rancourt 1983; Rancourt & Dionne 1982) and in Finland by Jarkko Leino (1987). Rancourt (Noble & Rancourt 1987; Rancourt & Dionne 1982, 11) views the three ways of knowing as three broadly defined modalities rather than as very specific ways of knowing. They are described in the following way:

> "Distinctively different, each of the three modes has its own characteristics. Specifically, the metaphorical mode utilizes the self-referent quality of personal/subjective experience as its most important criterion for the discrimination and selection of input data; the grounding and acceptance of the acquired data as knowledge is achieved by an analogical, intuitive, and holistic reasoning process. The empirical mode uses sense perceptions as the important criterion for the discrimination and selection of input data; the grounding and acceptance of accepted data as knowledge is achieved by an inductive process of reasoning. The rational mode utilizes logical-illogical concept assumptions and beliefs as the major criterion for the discrimination and selection of input data; the grounding and acceptance of knowledge for this mode is achieved by a deductive process of reasoning."(Noble & Rancourt 1987)

According to Rancourt (1986) the three ways of knowing deal with different types of data - theoretical data, facts and experiential data - about which three types of questions can be asked - is it logical, can it be experimentally proven, does it fit with my experience (table 4.3)

WAYS OF KNOWING	TYPES OF DATA	CRITERIA FOR ACCEPTANCE AS KNOWLEDGE
Rational	Theoretical data, knowing via thought	Is it logical? Is it theoretically sound?
Empirical	Facts, knowing via senses	Can it be experimentally proven?
Metaphorical	Experiential, phenomenological data, knowing via intuition and insight	Does it fit with my experience? Does it feel right?

Table 4.3 Types of data and criteria for accepting data as knowledge in the three ways of knowing (classification according to Noble & Rancourt 1987 and Rancourt 1986)

Compared with Royce's and Powell's classification, shown on the previous page, Rancourt emphasizes the types of data

more than cognitive abilities. These may of course be related, because we can assume that dealing with different types of data requires different cognitive abilities. The three types of questions that Rancourt (1986) connects to types of data are the same as Hunt (1987, 41) uses to identify learning styles; learning styles can then be identifyed by using theory, resesarch, or personal experience - of which Hunt himself prefers the last method. The emphasis on subjective experience seems to be stronger in Rancourt's characterization of the metaphorical way of knowing than in Royce's and Powell's; the latter connects the truth criterion to universality of the symbols or forms rather than to subjective feeling.

Royce and Powell (1983, 194-195) as well as Rancourt (1983; Rancourt & Dionne 1982, 11) and Leino (1987, 3-7) connect the three epistemologies to broad traditions in philosophy and science. Thus, rationalism and empiricism can easily be associated with the rationalistic and empiristic traditions in philosophy. Metaphorism is more difficult to classify, although generally associated with knowing in art and the humanities (Royce & Powell 1983, 194). What makes it difficult to clearly distinguish between the three modes of knowing is that they seem to involve a variety of elements that can be combined in different ways: types of data, criteria of truth, special types of reason, cognitive abilities etc.

Rationalism can be connected to the rationalistic theory of knowledge represented by e.g. Plato, Descartes, and Spinoza (pp.14-16). Plato, we can say, saw a special type of data as the source of knowledge: ideas. Since these data can not be the object of sense impressions, they require another path to knowledge: reason or thought. A parallel to this is seen in Rancourt's view that theoretical data and knowing via thought is the foundation of rationalism, although this view probably lacks the metaphysical assumptions

of Plato's idealism. The emphasis on thought as the primary instrument for reaching knowledge is also found in Descartes' rationalism. A special type of reasoning - the axiomatic and deductive type - which is also seen as characteristic of rationalism, can clearly be seen in Spinoza's philosophy. In modern theory of knowledge the rationalistic mode of knowing is most easily associated with formal truths, analytical and a prioric knowledge (pp.29-30), i.e. knowledge and truth that has to do with conceptual, logical and other types of formal relations, since it is only this type of knowledge that can be established by reason alone.

Empiricism as a mode of knowing is connected to the empiricist tradition in philosophy (pp.16-19), represented by, among others, Locke, Hume and Mill. A special type of data as the source of knowledge was emphasized by Locke: sense impressions. The primary instrument for reaching this type of knowledge is observation or perception, a method stressed also by Hume. The type of reasoning that starts from observations and proceeds to generalizations and theories is the inductive logic, which then becomes the main type of reasoning in empiricism. Inductive logic, in turn was of special concern to Mill. In later theory of knowledge the empiricist ideas can be said to apply to empirical or material truths and to synthetic and a posterioric knowledge, i.e. with knowledge that must be established by observation.

As Royce and Powell (1983, 194-196) note, modern science - especially as articulated in the logical empiricism - represents a combination of rationalism and empiricism. Science cannot do without observation (except for the formal sciences that only deal with formal truths) but the observations must be organized by concepts and reason; inductive as well as deductive logic is used in science. A scientific theory must be logical (rationalism) as well as experimentally or otherwise proven by observation (empiri-

cism).

While rationalism and empiricism seem fairly easy to concipiate in terms of type of data, instrument for achieving knowledge, type of reason, and truth criterion, metaphorism is more difficult to conceive of. It seems to be associated with subjective experiences, holistic and intuitive thinking, analogies and metaphors (Noble & Rancourt 1987; Rancourt 1983; Royce & Powell 1983, 194-195).

A metaphor, according to Perelman and Olbrechts-Tyteca (1969, 371-410), is a condensed analogy. An analogy in turn consists of two parts, theme and phoros. Analogical reasoning has to do with the resemblance of structures, and can be formulated: A is to B as C is to D. Perelman and Olbrechts-Tyteca use one of Aristotle's analogies as an example:

> For as the eyes of bats are (C) to the blaze of day (D), so is the reason in our soul (A) to the things which are by nature most evident of all (B).

A and B represent the theme, i.e. the part to which the conclusion relates, while C and D represent phoros, i.e. the part that serves to support the argument. In an analogy, theme and phoros belong to different spheres, as in Aristotle's analogy where phoros belongs to the sphere of senses and the theme belongs to the intellectual or spiritual sphere. In a metaphor an element from phoros is confused with one from the theme, which gives it a condensed form. Metaphors are especially useful in poetic and philosophical creation, according to Perelman and Olbrechts-Tyteca, while other types of analogies are used also in science. As they represent an imaginative type of thinking they serve as an extension of thought and thus as a means of invention in science. However, in order to be proved and to meet the criteria of science, the analogy must be rewritten so that theme and phoros belong to the same category.

Similar ideas can be found in Jacob Bronowski's essay "Knowledge as Algorithm and as Metaphor" (Bronowski 1979, 41-63). Bronowski conceives science and art - especially poetry - as two different languages, the algorithmic language and the metaphorical language that represent different formal structures. Metaphors can be used in science as a means of imagination and invention but - and here Bronowski agrees with Perelman and Olbrechts-Tyteca - in order to become part of a scientific theory they must be translated into algorithmic language.

The analogical character of metaphors as well as its special way of treating language has also been pointed out by Malmström (1988) and Pörn (1987). Malmström also remarks that metaphors seem to be founded on special associative links and that they often include a subjective element.

There seems then to be three types of logic: deductive, inductive and analogical, of which metaphors represent a special kind of analogical reasoning. This type of reasoning can be seen as "holistic" in the sense that it is a way of conceiving a large field of data and symbolizing it into a single form or symbol, i.e. the analogy or metaphor. Metaphors may be especially appropriate for symbolizing experiential data, while other types of analogies are used also to symbolize empirical fields of data (e.g. the planetary system as an analogy for the atom). Inductive and deductive reasoning are more concerned with specific relations. Both inductive and deductive reasoning are what Jerome Bruner (1977, 69-82) calls analytical types of reasoning while analogical reasoning is intuitive.

The picture of different types of data with respect to the instrument for acquiring data, cognitive processes and type of logic can now be enlarged (table 4.4).

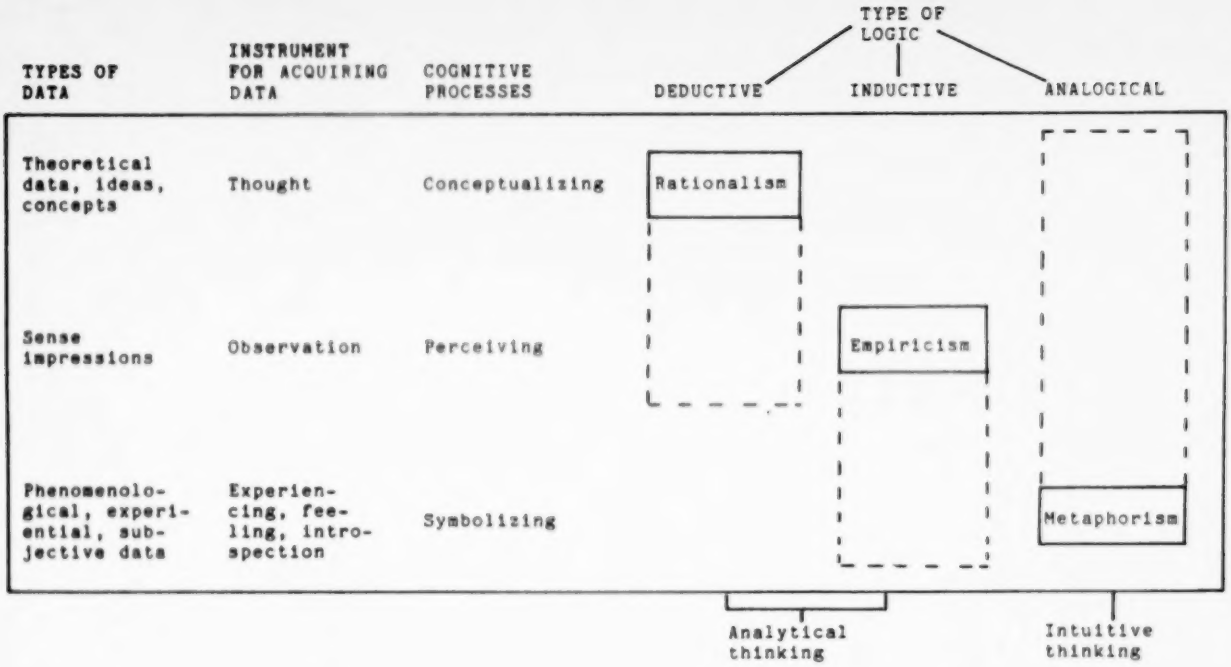


Table 4.4 The three ways of knowing with respect to types of data, instruments for acquiring data, cognitive processes and type of logic

According to table 4.3, there would be a quite straightforward connection between types of data, the instrument for acquiring data and cognitive processes, as they are usually conceived in the three modes of thinking. The connection to the types of logic, however, is more complicated. According to the table, different types of logic can be combined with different types of data. The "paradigm cases" of rationalism, empiricism and metaphorism are indicated by the straight-lined boxes. Thus, 'rationalism' usually means that deductive logic is used within the sphere of ideas and concepts, as in the case of axiomatic method. It is possible, however, to combine deductive logic with sense impressions and observations - this gives us the hypothetical-deductive method of the empirical sciences. 'Empiricism' in turn usually indicates the combination of observation, sense impressions, and inductive logic. Inductive logic however can also be extended and applied to phenomenological data. And, finally, 'metaphorism' usually refers to a combination of analogical reason with phenomenological and experiential data, while it is quite possible to use analogical reason with respect to all types of data. The possibilities of combining deductive logic with experiential data and inductive logic with ideas and concepts have not been especially indicated in the table but they can not be ruled out.

As has been indicated, metaphorism - and analogical reason as a whole - seems to involve self-referential, experiential and subjective elemants and feelings, while inductive and deductive reasoning - especially deductive reasoning and rationalism as a whole - are considered more "objective" (Malmström 1988; Noble & Rancourt 1987; Royce & Powell 1983, 135). This may have to do with the nature of intuitive and analytical thinking which are involved in analogical-metaphorical and inductive-deductive reasoning, respectively.

Analytical thinking has usually been described as moving

from one step to another in a systematic way, either deductively from premises to conclusions or inductively from observations to generalisations. This process is considered as relatively free from emotions and personal experience. Intuitive thinking, on the other hand, is usually described as holistic or global, involving a wide range of elements at the same time. It is also considered as more influenced by emotions, experiences, sub-conscious and unconscious elements. (Bastick 1982, 50-56; Black 1952, 13-28, 291-308; Bruner 1977, 69-82; Hult & Sarvimäki 1983, 3-6, 35-45; Lindholm 1983 and 1985, 130-173; Rosing 1978, 71-86)

The self-referential, emotional, experiential intuitive processes can thus be considered as key mechanisms in the creation and understanding of metaphors, since these processes give access to a wide range of associations and feelings. In Tony Bastick's theory of intuition the so-called emotional sets play an important part (fig. 4.6).

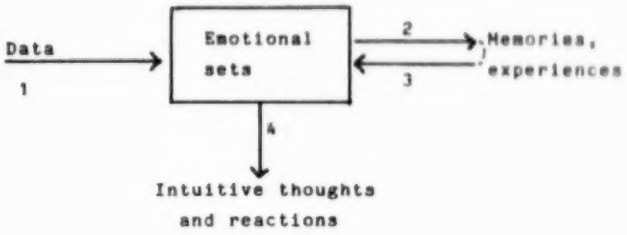


Figure 4.6 The mechanism behind intuitive thoughts and reactions (Bastick 1982, 111, modified by Hult & Sarvimäki 1983, 38)

According to this theory a person in every situation is in some emotional state. Everything a person experiences in

that situation becomes connected to this emotional state and in this way emotional sets are built up. When the person makes new perception or receives other types of data (1), these connect to the person's emotional sets. The emotional set that is activated then arouses memories and experiences that has previously been connected to this set (2). The aroused memories and experiences, in their turn, have access to more information and more emotional sets (3), and, as a result of this process of association and integration of new data with feelings, previous memories and experiences an intuitive thought or reaction occurs (4). It is the redundant information, which is supplied by the emotional sets, that makes new and unexpected associations possible. (Bastick 1982, 111, 354-391; Hult & Sarvimäki 1983, 38-42)

That intuitive processes are involved in metaphorism has been stressed by Rancourt (1983 and 1986). Described in terms of Bastick's theory, they would account for the self-referential and emotional aspects of metaphorism as well as for the holistic and imaginative. The metaphor would then be the intuitive thought or reaction that is the result of the process.

The three modes of knowing - rationalism, empiricism and metaphorism - are to be understood, as Rancourt (1983; Noble & Rancourt 1987) says, as broad knowledge-accessing modes. This indicates that there are differences not only between the modes but probably also within the modes. A person who is committed to sense impressions and empirical facts, for instance, can in principle use primarily deductive, inductive or analogical (-metaphoristic) logic. And a person who is committed to experiential and phenomenological data may use inductive as well as analogical-metaphorical logic.

Another possible source of difference within the modes of

knowing conerns the level of generality on which they operate. The "substance" of rationalistic knowledge, i.e. theoretical data, concepts, or ideas can occur singularly and separately or be organized into systems of ideas and principles and logical systems. Empirical knowledge, i.e. sense data, can also occur as single observations or they can be organized into systems of facts. As systems of facts they are called scientific theories, which are on a more general level than single facts and sense impressions. In metaphorism, occasional subjective experiences represent a low level of generality while universal symbols represent high generality. In Carl Gustav Jung's (1974, 67-69, 98; 1975, 11, 117) term we might say that a person who has access to his collective unconscious and its archetypes possesses metaphorical knowledge of a higher generality and universality than one who possesses only occasional personal experiences. In terms of Bastick's theory, pictured in figure 4.6, we can say that if the emotional sets are connected to deep layers of consciousness, arousing pictures in the collective unconscious (steps 2 and 3), metaphorical knowledge is on a high level of universality. This means, at the same time, that intuition operates on a high level, moving from simple, immediate insights through periods of incubation and analysis to new creative ideas (see Hult & Sarvimäki 1983, 43-44, 1984a and 1984b). Works of art that are of cultural significance represent a high level of metaphorical knowledge in the same way as valid and reliable scientific theories and highly abstract, logical systems represent a high level of empirical and rational knowledge respectively.

It is also possible for a person to move along a continuum of generality within a specific mode of knowing, or within all three modes, because, as Royce and Powell (1983, 229-231) as well as Rancourt's (e.g. 1983) and Leino's (1987) studies show, although one mode of knowing (or valuing) may

be dominant, a person exhibits all factors, traits, and processes to different degrees (fig. 4.7).

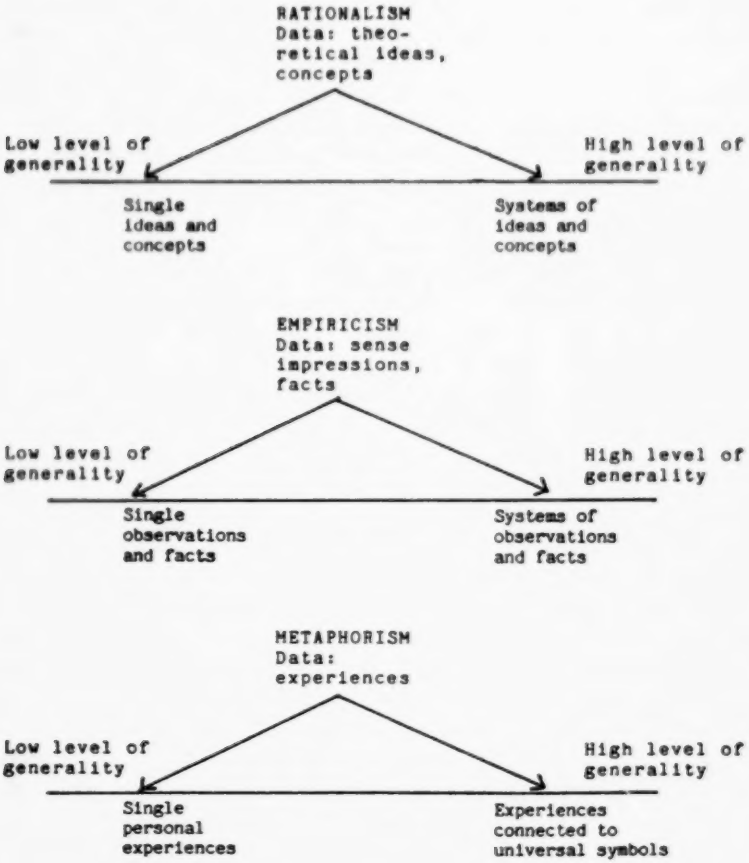


Figure 4.7 Levels of generality within the modes of knowing, represented as a continuum

Figure 4.7 shows a continuum from lower to higher levels of generality within the modes of knowing, where the arrows indicate the possibility of oscillating along the continuum.

In terms of the concepts and model used in this study, an actor's mode of knowing constitutes his epistemic orientation. A mode of knowing is then also an integral part of acting, since the mode of knowing functions as an internal action determinant.

While a person's axiological orientation includes value-knowledge (and ignorance), his epistemic orientation includes factual knowledge (and ignorance). Here the concept 'factual knowledge' is used in a large sense, involving not only empirical facts but all types of true beliefs. These true beliefs can be rational, empirical or metaphorical, in which cases they meet different truth criteria as they have been presented by Royce and Powell, and Rancourt. Appropriate action is a manifestation of beliefs that are true rationally, empirically or metaphorically; true beliefs are embedded in practical knowledge.

Just as the actor's axiological orientation does not involve only values and ideals but also action principles, so the epistemic orientation does not either include only beliefs of different kinds and at different level of generality but also action principles. The phase of acquiring and processing information can thus be described in the following steps:

1. Receiving data, e.g. about an educational or health care situation, the other participants, self.
2. Interpreting data, which involves viewing it in the light of previoulsy established beliefs. This corresponds to Royce's and Powell's (1983, 10-11) encoding and transforming data.

3. Formulating an action prescription on the basis of received and interpreted information about the situation. This corresponds to Royce's and Powell's (1983, 10-11) transformation and decoding data.

There is, then, as also Royce's and Powell's (1983, 10-17) theory suggest, an "input" as well as an "output" side of information processing and transformation.

Royce's and Powell's as well as Rancourt's descriptions of the three modes of knowing indicate that they refer primarily to step 1 and 2 in the information acquiring process: the descriptions concern the type of data that are singled out, truth criteria and cognitive abilities involved in acquiring and processing these data. The theory presupposes, however, a continuous interplay between knowing and acting, which implicates that the modes of knowing are manifested also in action. In order to complete the sequence the following three action principles can be formulated, corresponding to the three modes of knowing:

Rationalism: Plan and implement your action on the basis of principles and logical consistency!

Empiricism: Plan and implement your action on the basis of empirical facts and your own observations and sense impressions!

Metaphorism: Plan and implement your action on the basis of your personal experiences, your feelings, imagination and intuition!

These principles can actually be conceived of as meta-principles. They do not tell the actor exactly how to act in a situation, only on what grounds he shall formulate his more specific prescriptions. From these meta-principles more specific action rules and prescriptions can be de-

rivated in various contexts and situations.

A simplified version of the modes of knowing, using Rancourt's types of data and criteria for accepting data as knowledge as step 1 and 2, can now be completed with the corresponding action principles, step 3 (table 4.5).

	TYPE OF DATA	CRITERIA	ACTION PRINCIPLE
R	Theoretical ideas, concepts	Logic, theoretical soundness	Follow principles, act consistently!
E	Sense impressions,	Observations, experiments	Follow empirical facts and your own observations!
M	Experiential, phenomenological	Subjective experiences and feelings	Follow your feelings, experience, intuition and imagination!

Step 1 ⟶ Step 2 ⟶ Step 3

Table 4.5 The three modes of knowing as three ways of receiving and interpreting data and formulating action principles

Step 3 can be said to be implicit in Royce's and Powell's as well as in Rancourt's theory. Since the modes of knowing are assumed to be a part of an actor's personality (Royce & Powell 1983, 10-17), it is only natural to conclude that they also influence his way of acting, i.e. not only his world view but also his life-style. Rancourt's instrument for measuring modes of knowledge accessing (KAMI = Knowledge Accessing Mode Inquiry) accordingly includes items that can be considered as measuring how the modes of knowing are manifested in action.

In the same way as the different types of values (intrinsic,

self, social) all have their specific role in health care and education, so the different modes of knowing complete each other.

Rationalism makes it possible for an educator or health care provider to establish principles, make plans and act consistently and systematically. It also helps him present ideas logically as well as to understand and analyze his practice in terms of concepts, theories, and abstract principles. According to Benner's (1984, 20-33) description of different levels of performance, a rationalistic mode of knowing seems to be embedded in the lowest as well as the highest level. However, rationalism apparently has a different role in the expert's performance than in the novice's. The novice, lacking experience of the situations where she is expected to perform, has only rules and abstract concepts to rely on. This makes her performance rigid (she cannot "flex") and she has difficulty in applying the rules and concepts. The expert, on the other hand, acts upon experience, intuition and observation, and uses concepts and theories to analyze the situation and find new solutions, if she is confronted with problems. Rationalism, so to speak, transforms from rule-stating and models for action to analysis, reflection, and problem solving.

Empiricism makes it possible for the educator or health care provider to make correct observations in interpersonal situations. The ability to "read" a situation and the reactions of the other participants can thus be seen as a manifestation of the empirical mode of knowing. This ability has been stressed by Benner (1984, 32-33) as well as Hunt (1983b;1987,146-149). This mode of knowing also helps the practitioner concentrate on details and objective, empirical facts.

Metaphorism, finally, makes it possible for the educator or health care provider to relate to and utilize his own

experiences and feelings and to relate to the feelings of students or patients. Metaphorism also makes it possible to use imagination, and, accordingly, to be creative in an interpersonal situation. This mode of knowing is also stressed as important by Hunt in his view of teaching and other types of interpersonal communication as a "reading- and flexing" or "matching-in-the-moment" process:

> "I think that such matching to metaphoric modality is one of many features of what I have called 'matching in the moment' (Hunt 1983), the split-second, intuitive adaptation which makes interpersonal communication possible.
> /.../
> I believe that the essence of teacher interpersonal skills is the intuitive, split-second adaptation which teachers make in the moment to unanticipated circumstances, a quality which pervades skilled teaching performance and which is not easily removed as a single part of that whole skilled performance." (Hunt 1983 b)

Traits that belong to metaphorism are also stressed by Benner, who sees them as embedded in the functioning of the expert nurse:

> "The expert nurse, with an enormous background of experience, now has an intuitive grasp of each situation and zeroes in on the accurate region of the problem without wasteful consideration of a large range of unfruitful, alternative diagnoses and solutions.
> Capturing the descriptions of expert performance is difficult, because the expert operates from a deep understanding of the total situation; the chess master, for instance, when asked why he or she made a particularly masterful move, will just say: 'Because it felt right.' 'It looked good.' Or when the expert business decisions makers are asked about which factors they would identify and what weights they would give them for a hypothetical decision, the most likely response would be, 'Well, it all depends.'" (Benner 1984, 32)

Metaphorism, then, seems to be a necessary component of high level performance in different areas. But, as Benner points out, this requires much experience. Thoughts along the same lines have been presented by Berliner (1986).

It seems, then, as if complete practical knowledge, manifesting itself as appropriate action in predictable as well as unanticipated situations, requires a combination of different modes of knowing - rational, empirical and metaphoric. Each gives it own distinctive contribution to practice: conceptual analysis, consistency and systematization, observation, empirical facts and details, feeling, subjective experiences and imagination. A combination of the three modes of knowing in action does not mean that they have to be equally strongly represented in every practitioner; however, every practitioner must probably be able to manifest all the modes of knowing to some degree and to oscillate along the continuum of different degrees of generality: from single ideas, observations and personal experiences to systems of concepts and observations and universal symbols.

A combination of the modes of knowing makes it possible for the practitioner to master the complex, interactional knowing how of education and health care: to "read" and "flex", acquire different types of information, plan and decide, implement and evaluate, and combine the different aspects of interaction: communicative, strategic, instrumental, discoursive, and expressive. As practical knowledge this complex knowing how is knowing-in-action, and, as both Elbaz (1983, 5) and Benner (1984, 32) remark, this knowledge may be extremely difficult to account for in concepts.

4.3.4.3 Ability

Practical knowledge, manifested in appropriate action, therefore involves an axiological orientation and an epistemic orientation. But in order to account for practical knowledge as manifestation of internal action determinants a third type of determinants is required: ability.

In Royce's and Powell's (1983, 86-113) theory abilities are treated as integral parts of the other systems. Motor factors like multilimb coordination, steadiness and reflexivity, for example, are at the same time considered motor abilities. And the key factors in the cognitive system - perceiving, conceptualizing and symbolizing - are also treated as cognitive abilities.

In this study abilites are treated as a separate group of internal action determinants. This does not mean that they are considered as functionally independent. There is a continuous interaction between all determinants and processes of the human action system. The reason for treating abilities separately here is primarily a striving to emphasize their role in practical knowledge.

Ability can be defined as the actual power to perform an act,meaning that a given person can perform the act concerned, provided with the necessary external circumstances. A person who has the ability to perform an act can, on most occasions, perform it; he knows how to do it. (Klausmeier & Goodwin 1968, 34; v.Wright 1963, 48-49)

This definition shows certain similarities between practical knowledge and ability. In this study practical knowledge has also been characterized as knowing how to do something; a person who has practical knowledge in educating knows how to educate - he can educate. In this text, however, there are also important differences between practical knowledge and ability. Firstly, practical knowledge has a moral aspect, which ability has not. Secondly, practical knowledge includes the whole practice while ability concerns more limited acts and procedures that make up the practice.

Knowing how to educate and how to provide health care

requires ability to perform a wide range of acts, e.g. ability to demonstrate how something is done, ability to give a lecture, ability to conduct a discussion, ability to give an injection, ability to understand another person, ability to support another person and so on. These abilities can be grouped according to the phases of the action sequence. Thus we can say that in order to have practical knowledge a practitioner must have certain abilities to acquire information, abilities to plan and make decisions, abilities to implement appropriate actions and abilities to evaluate. Most of the examples mentioned above have to do with the implementation of different acts.

The ability to perform an act requires in turn mastery of a set of skills. The ability to give a lecture, for instance, requires skill in talking and in visualizing, ability to acquire information may require skill in observing and listening, etc. This use of terms differs somewhat from v.Wright's (1963, 50). According to him skill is connected to the performance of complicated activities, not to any ability. According to the usage of terms in this study, all ability requires some kind of skills.

The terms 'practical knowledge', 'ability', and 'skill', thus constitute a hierarchy, where 'practical knowledge' refers to the practice as a whole with all its phases, aspects and levels, while 'ability' refers to the performance of specific acts and procedures and 'skill' to the mastery of techniques and processes involved in the performance of the act.

The relationship between these hierarchical levels can be clarified by some examples (table 4.6).

PRACTICAL KNOWLEDGE	ABILITIES	SKILLS
Knowing how to provide health care	1. Knowing how to assess the patient's needs	Knowing how to a. make observations b. listen c. make inferences
	2. Knowing how to teach the patient	Knowing how to a. communicate verbally b. visualize c. listen
	3. Knowing how to comfort a patient	Knowing how to a. express one's feelings b. listen
Knowing how to educate	4. Knowing how to give feedback to a student	Knowing how to a. observe the student's reactions b. make inferences c. communicate verbally and non-verbally
	5. Knowing how to show a video film to a class	Knowing how to a. use the technical equipment b. choose the right moment c. observe the reactions to the film

Table 4.6 Examples of abilities and skills required for practical knowledge in health care and education

The examples in table 4.6 are only casual examples of abilities and skills required in health care and education - they are by no means exhaustive or systematically presented. The main idea is to point out the difference in hierarchy between practical knowledge, ability, and skill.

As was mentioned previously (p.48), v.Wright makes a distinction between first order and second order abilities:

a person's first order ability constitutes what he can do, his second order ability constitutes his capacity and includes abilities that he can acquire. Klausmeier and Goodwin (1968, 34-35) use the terms in the same way as v.Wright - 'ability' refers to what a person can do now, 'capacity' refers to what he might be able to do as a result of further education or maturation. Koort (1974, 40) again uses the terms 'actual capacity' and 'potential capacity', making 'capacity' the key term. He uses 'actual capacity' in the same sense as Klausmeier and Goodwin, and v.Wright, use 'ability', and 'potential capacity' in the same sense as their 'capacity'. Pörn's (1981 and 1984a) term 'repertoire' corresponds primarily to v.Wright's as well as Klausmeier's and Goodwin's 'ability': it refers to what an actor can do.

There may then be a discrepancy between an actor's ability and his capacity. This discrepancy, according to Klausmeier and Goodwin (1968, 34), can be due to the fact that the actor has not learned all he can learn or that he is not yet mature enough. There may, however, also be other factors that cause a discrepancy. Sickness, for instance, or exhaustion and fatigue, can for a longer or shorter time diminish an actor's ability: he cannot, for the moment, do what he normally can. In this case we may say that the actor still has the ability - it is just for the moment impossible for him to exercise it. But as soon as he gets better, he is again able to do what he could before he got sick or exhausted. Sickness and exhaustion can in this case be called internal obstacles for the exercise of ability. There may also be external obstacles, like lack of necessary equipment. A person may, for instance, normally be able to ride a bicycle. However, for the moment he may not be able to do it, either because he has broken his leg (internal obstacle) or because he has no bicycle (external obstacle).

Having the ability to do something has previously in this study (pp.53-54) been called procedural knowledge. A person who has the ability and skills necessary for the performance of different kinds of acts in education and health care can thus be said to have the required procedural knowledge. Practical knowledge, accordingly, is a manifestation of procedural knowledge as well as of value-knowledge and true beliefs (rationally, empirically or metaphorically true).

4.3.5 Action schemata and implicit theories

An actor's internal action determinants - his axiological orientation, epistemic orientation and ability - function as an integrated whole in determining and orienting action. This integrated whole thus includes values, ideals, beliefs, abilities and skills as well as action principles, modes of thinking and acting.

These integrated wholes of internal action determinants can be equated with Piaget's action schemata and Hunt's implicit theories.

Jean Piaget emphasizes the active nature of knowledge in much the same way as Dewey and Lewis (pp.31-32): there is a continuous interaction between knowledge and action in that knowledge is acquired and built up through action and that this knowledge determines subsequent action:

> "Knowing does not really imply making a copy of reality but, rather, reacting to it and transforming it (either apparently or effectively) in such a way as to include it functionally in the transformation systems with which these acts are linked (Piaget 1971, 6)."

This active nature of knowledge concerns, according to Piaget (1971, 6-8), all kinds of knowledge. Knowledge

about the physical world, for instance, is acquired through active experimentation. Even logical and mathematical knowledge builds upon systems of operation. Thus, Piaget's view also corresponds to Rescher's (pp.32-33) according to which so called theoretical and scientific knowledge also rests on practical postulates.

Knowledge, according to Piaget (1971, 7-8, 268-345), is organized into action schemata, which functions as some kind of action code or prescription. Namely, whenever similar situations occur, actions tend to repeat themselves. Some action schemata according to Piaget are innate, like instincts, while others are acquired. Intelligence has evolved as one instrument for constructing knowledge and has, in the same way as knowledge, an active, instrumental character.

Neisser (1982, 24-27, 48-66) has adopted the terms scheme and schemata to his theory of perception and cognition. He explains that the terms initially come from action theory but that they can also be applied to perception, since, ultimately, perception is an activity. In perception the scheme directs the search for information. The knowledge that is acquired then changes the scheme and, thus changed, the new scheme directs the search for new knowledge. Neisser calls this process the perception cycle. A scheme works, in a way, both as some kind of format and as a plan: it determines of what kind the knowledge has to be in order to be accepted and it guides the knowledge acquiring activity.

P.J. Galperin's (1979, 59-88) terms orientation and orientational connection is in some respects similar to Piaget's and Neisser's schemata. They refer to an actor's way of directing his perception and action. However, Galperin seems to exclude instinctive and automatic connections.

Orientation occurs, according to him, when the actor is confronted with a new situation. Orientation is the control of action throughout the action process and it involves investigating the situation, clarifying the object of the actual need, investigating alternative means for achieving the aim, control and revision. Galperin's orientation as action control thus resembles the conscious and reflective control of an action sequence of the kind described in the action model of this study.

Hunt (1977;1983b;1987) uses the concept implicit theory to refer to the body of knowledge that is manifested in the practice of teachers, counselors, supervisors, and other practicians. In the transactional sequence of feedback, perception, intention and action, the implicit theory intervenes between perception and intention, thus functioning as a frame of reference for interpreting perception and guiding action (fig. 4.8).

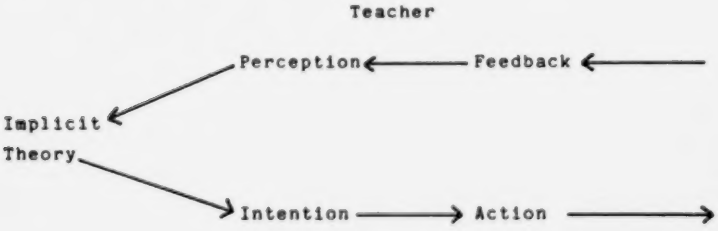


Figure 4.8 Implicit theory in action
(Hunt 1987, 148)

The practitioner's implicit theory consists of different elements, of which Hunt (1987, 58-81) mentions the practitioner's beliefs about her work, her main concepts, her matching models and her metaphors. That the theory is im-

plicit means that it is manifested in practice; however, the practician may not be aware of her implicit theory. In principle, it is possible to make implicit practice theories explicit, which makes it possible to reflect on one's practice and its foundations.

The idea of an implicit practice theory guiding the teacher's and counselor's work has also been put forth by Gunnar Handal and Per Lauvås. According to them a practice theory is a private construct in the teacher's mind. It is a continuously changing system of knowledge, experience, and values, relevant to the actor's teaching practice. Handal emphasizes that a practice theory - although individual - does not include elements only on the actor's level, i.e. elements that refer to individual actors and interaction between them, but also elements on the organization and system level. (Handal 1984; Handal & Lauvås 1982, 13-32)

Handal's remark that a practice theory includes elements on the actor level as well as on the organization and system level means in terms of the categories of practical knowledge used in this work (see p.90) that it includes interpersonal as well as socio-cultural elements. Most of the elements that Hunt (1987, 58-81) mentions belong to the interpersonal level, implying that it represents more of an interpersonal practice theory, while, according to Handal, a practice theory is also a socio-cultural theory, involving values.

Of the terms presented here - action schemata, practice theory and orientation - action scheme, or schemata, seems to be the most overreaching one, referring to an integration of axiological as well as epistemic elements and ability. A practice theory again seems to involve axiological and epistemic elements but not ability; it is always implicit in the sense that it is embedded in practice but it can

also be made explicit. When a practice theory is made explicit it can be used as a means of reflective orientation. Implicit action schemata and practice theories thus represent what Schön (1983, 50-69) calls knowledge-in-action and knowledge-in-practice, while the explicit theories represent reflection-in-practice. The picture of the internal action determinants can now be completed so as to include action schemata and practice theories (fig. 4.9).

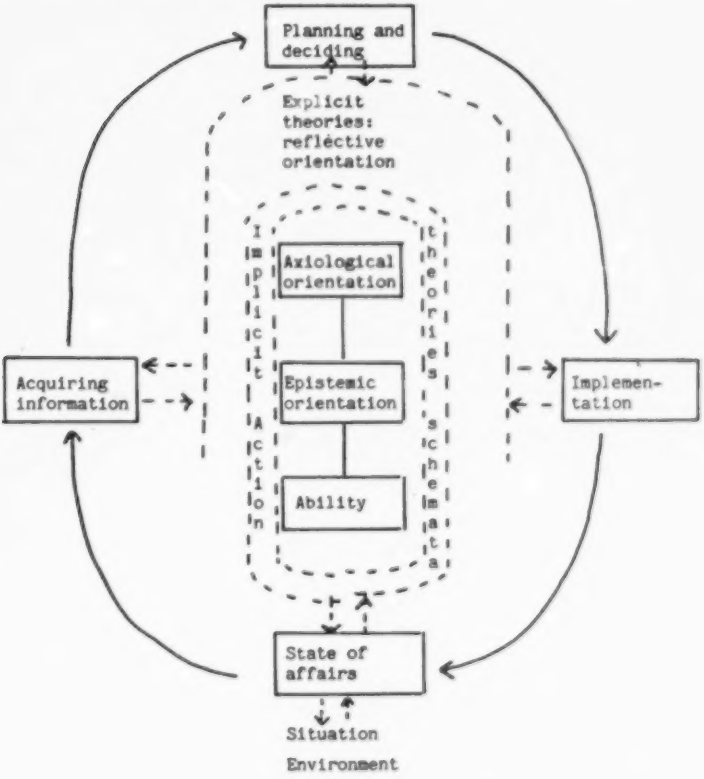


Figure 4.9 The internal action determinants organized into schemata and theories in action

According to figure 4.9 the action sequence is a manifestation of action schemata and implicit theories as well as reflective orientation. These schemata and theories, embedded in action, are in turn integrated wholes, involving an axiological and epistemic orientation as well as a set of abilities. This complex whole of action determinants constitutes a locus of action control.

Appropriate action in education and health care, i.e. practical knowledge, is a manifestation of adequate schemata and practice theories - implicit as well as explicit and reflective. Inappropriate action, i.e. practical ignorance, is a manifestation of inadequate schemata and practice theories. In the first case, a person exhibits knowing-in-action, in the second case not. The schemata and theories must be adequate with respect to the concrete interpersonal situation and with respect to the socio-cultural context. This follows from the categorization of practical knowledge into an interpersonal and a socio-cultural level, involving moral participation in a socio-cultural form of life as well as "reading" and "flexing" in a concrete, interpersonal situation.

The distinction between implicit and explicit schemata and theories is made on the basis of whether the schemata and theories are articulated or not. The whole area of unarticulated knowledge, built up through direct experience, confrontation and acquaintaince may thus be organized into extensive schemata and implicit theories, controlling action largely in an unreflected way. When this fund of knowledge is articulated it becomes explicit and can be used in conscious reflection. However, as was noted before (p.54), some elements of practical knowledge can in principle never be articulated, they exist only in action, e.g. in the feeling for a situation or a material, or in dexterity and the mastery of skills and technique (see also Benner 1984, 32; Entwistle 1976, 45; Hartnett & Naish 1976, 113-115;

Polanyi 1958, 49-65).

The schemata and theories can also be either latent or manifest. Schemata and theories are manifest when they are actually exercised in practice. That they are latent means that they can be manifested when the situation so requires. A nurse, for instance, may know how to resuscitate, but as long as the circumstances do not call for her to exercise her knowledge, it remains latent. However, when the situation so requires, she can manifest her knowledge - has the adequate schemata, theories, and abilities - and act appropriately.

The distinction between latent and manifest practical knowledge is not synonymous with the distinction between implicit and explicit knowledge. A practitioner may well be able to manifest knowledge in action that is not conceptually explicit. On the other hand, he may also be able to articulate knowledge conceptually and explicitly that he is not able to manifest in action.

4.3.6 On the development and restructuring of the control system

As can be seen in the various figures depicting the action system (e.g. figures 2.3, 4.2, and 4.9), the direction of control and influence goes not only from the internal action determinants to the different phases of the sequence but also in the opposite direction. This means that there is a continuous feedback from action to locus of control. Through action not only external states of affairs are changed but also the internal action determinants themselves.

This has been pointed out, at least, by Dewey (1934, 104, 264 and 1963, 44-45), Piaget (1971, 6), Neisser (1982, 24-27), and Handal and Lauvås (1982, 14), who all emphasize that experience, schemata and practice theories are continually changed and modified through the process of action.

This process is generally called learning. Learning, then, is a change in the internal action determinants that will facilitate appropriate action in forthcoming situations. Since man is continuously acting and interacting throughout the process of living, learning takes place all the time and everywhere.

David Kolb views learning as a holistic adaptation to the world. By this he wants to say that it involves all aspects of the person, that it is an ongoing process, and that it serves adaptation. In his more precise definition of learning he characterizes it as "a process whereby knowledge is created through the transformation of experience". This process can be described as a sequence involving four phases: 1. immediate concrete experience, 2. observations and reflection on experience, 3. construction of a "theory", i.e. formation of abstract concepts and generalizations, and 4. testing implications of the "theory" in new situations. The fourth phase leads back to phase one, making learning a four-stage cycle that is a continuous process. (Kolb 1984, 20-38)

A conception of the learning process, based on Galperin and Davydov, has been developed by Yrjö Engeström. According to him a complete learning process involves six phases: 1. motivation, arising from a cognitive conflict, 2. orientation, meaning that the student forms a plan or a model about how to approach the conflict, 3. internalization, i.e. integration of new and old knowledge into a new model, 4. externalization, meaning that the student applies the new model in action, 5. evaluation, that is, the student examines critically the validity and truthfulness of the model, and 6. control, i.e. the student examines his process of learning and tries to improve it. (Engeström 1982, 43-50 and 1984, 110)

There are some similarities between Kolb's and Engeström's

view, and also between these and the views on action and knowledge presented in this work. Both Kolb and Engeström describe learning as an activity involving the formation of concepts, models and abstract generalizations through observation and internalization, as well as active application and testing of learned models in new situations. The exact order and number of specific stages is not the same, however. The general idea in both models seems to correspond to a general model of action. Kolb (1984, 32-33) on his part has made a comparison between the research process, the creative process, decision making, problem solving and learning, and concludes that they exhibit similar features. The similarities can be explained by means of the common structure inherent in all kinds of action. According to the general action model used in this study, all action involves acquiring information, planning and deciding, implementation and evaluation. This structure can thus be seen in education and health care as well as learning, research and problem solving.

Learning can occur in two ways: as a "side-effect" to some other action sequence or as an action sequence of its own. In various situations in daily life, for instance, in carrying out ordinary activities, an individual's implicit theories and action schemata can be modified or strenthened. A personal crisis can be a source of major re-orientation: suddenly the old schemata are no longer adequate and the individual has to develop new ones. This may require changes in the axiological orientation, epistemic orientation or the acquiring of new abilities. Thus, the individual develops new ways of adapting to reality. Work, travelling, social life etc. - all these activities provide learning situations. However, people probably differ as to how apt they are to "learn from life". Some people are more flexible and open; they seem to be involved in a constant process of revising and developing their internal

action determinants, some seem to go through life without anything ever happening to them - they repeat the same schemata over and over again, despite changes in the external environment. Kolb (1984, 35) uses an old saw to exemplify this: "He doesn't have 20 years of experience, but one year repeated 20 times". According to Kolb this can be explained by referring to the subjective and personal and the objective and environmental side of experience that Dewey (1963, 39, 42) talks about. Dewey views every normal experience as an interplay between external and internal conditions. Thus, we may call a person inexperienced if nothing has ever happened to him externally, i.e. there have been no changes in his environment, or if nothing has happened to him internally, i.e. the external changes have not influenced him subjectively and personally. "Learning from life", then, which can be seen as one form of experiential learning, presupposes experience: a personal response to what goes on in the environment. In addition to this, learning also requires reflection on experience, inferences and generalizations, and application of new knowledge in new situations.

In educational situations learning occurs as an action sequence of its own, since these situations are usually designed for learning to take place. However, these situations are only a special type of life situations, where a lot of things may be learned that are not included in the officially planned learning process. Broady's (1986) investigations into "the hidden curriculum" shows that this is the case. Here, too, learning occurs as a "side-effect" to the official learning process. "The hidden curriculum" may give rise to strong and persistent action schemata and implicit theories, which are acquired through acquaintance and confrontation but never reflected upon; their persistence and strength may expressively be due to the fact that this learning is not consciously reflected on.

4.4 Collective practical knowledge

In organized practices like education and health care not only separate individuals but also whole professional groups can be conceived of as actors. Professional groups are referred to as collective actors.

The view of a professional group as a collective actor implies that the whole group be described as a common action system, acquiring information, planning and deciding, implementing and evaluating. It also implies that the whole group has a common locus of action control, consisting of an axiological and epistemic orientation and a set of abilities, organized into common action schemata and practice theories. Handal (1984) points to the collective nature of practical knowledge when he defines practice theory as both individual and collective, but except for him, most of the researchers that have been referred to previously in this study have confined themselves to the individual nature of practical knowledge.

4.4.1 Collective practical knowledge as manifested in common practices

When a whole professional group is referred to as a collective actor, the attention turns to the way in which this group as a whole participates in the surrounding form of life and what kinds of interactional patterns the collective has created; that is, we turn to the socio-cultural and interpersonal level of practical knowledge as they are manifested in the common practices of the professional group concerned.

If the practice of the whole professional group - e.g. the teachers or the caring professionals - is such as to promote and manifest a life worth living, the group can be said to have practical knowledge of the socio-cultural le-

vel. Here, again, moral knowledge as knowledge of a life worth living is crucial. Since education and health care have been characterized as moral forms of life and moral practices, the professional groups working in these practices can be described as what Robert Brownhill (1983, 102) calls moral communities:

> "The moral person operates in a moral community and they will watch his actions and examine the principles he refers to, and the precedents he follows. The process can be formally analysed.
>
> His actions will be judged on the following criteria: (a) Is the action a moral one, that is, is the person obeying a moral rule which he claims has universal validity, and that therefore it should be applied in all circumstances that have the same relevant characteristics; (b) If the rule is acceptable then is the action consistent with the rule he claims he is following; (c) Is it applicable, that is, is it the right rule to apply in the circumstances; (d) Is it justifiable in terms of the moral code of the community? If these criteria are met then we can say the action will be accepted as a moral action."

The professional groups thus work as moral communities, guided by common moral codes that formulate the common moral principles. The practices that the groups are involved in are guided by common goals and follow common patterns of interaction and co-action. These common patterns, principles and goals manifest what the professional group as a whole consider as a valuable form of life. If the common practices actually succeed in manifesting and promoting such a form of life they can be said to be a manifestation of practical knowledge: the professional group knows how to educate and care.

When practical knowledge is conceived as manifested in common practices, the whole profesional group is treated as one collective actor. This again means that the professional group is conceived of as being involved in social action guided by a we-intention (see p.108).

4.4.2 Practical knowledge as a manifestation of a common axiological and epistemic orientation and common abilities

In the same way as the individual practitioner's action is a manifestation of a set of internal action determinants, so can the collective actor's practical knowledge be conceived of as a manifestation of a collective axiological orientation, a collective epistemic orientation and a collective set of abilities.

4.4.2.1 Collective axiological orientation

The professional group's collective axiological orientation is made up of the common ideals, values and principles of the practitioners concerned. Since both education and health care have been characterized as moral forms of life and moral practices and since the collective has been characterized as a moral community, the primary values are moral. Utilizing Royce's and Powell's (see p.123) theory of personality and life style, we may say that the primary values are social, altruistic values, manifesting themselves in the moral life-form.

As collective the ideals, values and principles are part of World 3, they do not exist only in the individual minds of practitioners - they are common property to whole groups of practitioners.

The common values and principles, manifesting the professional group's view of a valuable life, are not only expressed in action. Many professions also have written codes that articulate the common axiological orientation. This especially concerns different health care professions. Examples of codes specifying a common axiological orientation are The Hippocratic Oath, The Geneva Declaration, The Hawaii Declaration, The Florence Nightingale Oath and

ICN:s ethical principles for nurses (see e.g. Achté et al. 1982, 286-324, Sundström 1984 and Bonair 1984).

Expressed in action, these oaths and declarations become practical value-knowledge of the different professional groups; they are manifested in an altruistic, caring relationship, in trying to help another person to health and well-being, in respecting the feelings, needs and wishes of the other, in standing up for the weak and oppressed, in respecting the dignity and rights of the other etc. In short, they are manifested in the whole professional group's striving to guarantee a good and valuable life for patients and clients. If this is not the striving of the collective of practitioners, practice manifests value-ignorance.

4.4.2.2 Collective epistemic orientation

The idea that different disciplines entail different ways of thinking and knowing has been put forth by, among others, Bruner and Phenix.

Bruner (1977, 22-24, 32-47; 1980, 74, 97-111) argues that different subjects have different structures and, accordingly, must be learned and taught in different ways. He also supports the idea that science and art are two different ways of knowing, entailing different grammars.

Phenix (1964, 6-12, 26-29, 53-57), reasoning along the same lines, claims that different disciplines represent different realms of meaning and that knowing means different things within different disciplines: each discipline has its own logic, its own way of gaining and validating knowledge.

It is this very idea that is also found in Royce's and Powell's (1983, 194-196) theory of cognitive styles, personality and world view.

If each discipline is characterized by a specific mode of gaining and validating knowledge, it would be natural to assume that scientists and practitioners in different disciplines exhibit different modes of knowing and thinking. This assumption has been empirically investigated in Canada by Rancourt and in Finland by J. Leino.

Rancourt and Dionne (1982) have investigated teachers of different subjects and shown that they tend to have different cognitive styles, which indicates the impact of the structure and logic of the subject. Noble and Rancourt (1987) have studied varied groups of practitioners, using Rancourt's Knowledge Accessing Mode Inventory (table 4.7).

PRACTITIONER	N	M	E	R
Air traffic controllers	36	8.4	11.1	80.5
Fine arts teachers	75	52.0	37.3	10.7
Mathematics teachers	35	13.4	26.2	60.4
Musicians	15	39.3	32.1	28.6
Sciences teachers	53	9.4	73.6	17.0
Textile craftspeople	26	37.6	34.5	28.0

M=metaphorism
E=empiricism
R=rationalism

Table 4.7 Relative frequency distribution (%) of knowledge accessing modes of various groups of practitioners (Noble & Rancourt 1987)

Noble's and Rancourt's results show a tendency toward metaphorism among fine arts teachers, toward rationalism among mathematics teachers and toward empirism among sciences teachers, which is in accordance with the assumptions about the nature and structure of knowledge in these disciplines.

Leino's (1987) studies of teachers of different subjects in Finland point in the same direction as Rancourt's results. Teachers in the lower grades and in kindergarten, who

do not teach only one specific subject or only a group of related subjects, scored highest on metaphorism.

The intention here is not to analyze the empirical results in detail and draw any far reaching conclusions, since, for one thing, the empirical material available in the studies presented is too limited for this, and for another it would not serve the purpose of the study. What can be pointed out, however, is that the nature of epistemic orientation among educators varies, there is not one dominant type of orientation. It varies depending on e.g. subject and level of teaching.

Noble's and Rancourt's (1987) study of students in health care areas show some differences between the groups (table 4.8).

SAMPLE	N	MOST COMMON MODE	LEAST COMMON MODE
Administration	32	R (40.6)	M (28.1)
Medical	45	R (46.7)	M (13.2)
Nursing	52	E (53.9)	M (09.6)

M=metaphorism
E=empiricism
R=rationalism

Table 4.8 Most and least common mode of knowledge accessing among health administration, medical and nursing students (adapted from Noble & Rancourt 1987)

The sample in Noble's and Rancourt's study was taken from a Canadian university and the point of the study was to investigate the possibility that interdisciplinary conflicts in health care may be due to different modes of knowing and thinking.

Leino's (1987) study, which also included nursing students, show some interesting differences between Canadian and Finnish nursing students involved in the study. 28 nursing

students took part in the study. The relative frequency distribution shows that metaphorism is the most represented mode (table 4.9).

	M	E	R
Finnish nursing students	35.5	35.3	29.2
Canadian nursing students	28.0	39.1	32.9

M=metaphorism
E=empiricism
R=rationalism

Table 4.9 Relative frequency distribution (%) of knowledge accessing modes among Finnish and Canadian nursing students (adopted from Leino 1987, 27)

Again it must be said that the samples used in the studies are far too small to allow for any deep analysis and not representative. The results may of course be indicative, in which case metaphorism would be the dominant style among Finnish nurses while it would be the least represented one among Canadian nurses. Rationalism, again, would be the least represented style among Finnish nurses. Trends that are similar to Leino's have been found by Stenbock-Hult (1988).

In his comparisons between Finnish and Canadian teachers and teacher students as well as nursing students Leino (1987, 25-31, 36-37) points to the fact that there is, along the line, a higher degree of metaphorism in the Finnish material than in the Canadian and also a lower degree of rationalism. According to Leino, this may be due to cultural differences.

Rancourt's and Leino's studies indicate that there may be differences in the knowledge accessing mode between different groups of practitioners in the health care area but that there may also be cultural differences. This also concerns different groups of teachers. The results, however, are not

easy to interpret without more data and information, for instance, about different kinds of background factors. According to the initial ideas of Bruner and Phenix, the differences in modes of knowing should be due to differences in the structure and logic of the disciplines. But what about the differences between medical students and nursing students in Noble's and Rancourt's (1987) study - is it actually the disciplines themselves that are different or could the results have something to do with the fact that nursing students tend to be women while there are usually more men among medical students? And what about the cultural differences between nursing students indicated by Leino (1987) - can the structure and logic of a discipline be different in different cultures?

It is possible that disciplines are different in that some are more clearly connected to a special mode of knowing while others are more varying. The connection between mathematics and rationalism, natural sciences and empiricism, and fine arts and metaphorism, for instance, can be considered as rather clear and these disciplines are often used as paradigm cases of the corresponding mode of knowing. This mode of knowing is accordingly the strongest one among teachers in these areas (Leino 1987; Noble & Rancourt 1987; Rancourt & Dionne 1982). However, the practice of education as such has its own structure and logic, partly independent of the subject taught. As has been argued previously (pp.142-144) education - as well as health care - involve all modes of knowing. Interactive practices are very complex. Conceived of as applied disciplines they involve application of knowledge from various basic disciplines (Phenix 1964, 318-320) which requires the use of modes of knowing,characteristic of the basic disciplines. Conceived of as practical disciplines that also generate knowledge of their own, they also involve all modes of knowing.

Since the practices studied here contain different types and modes of knowing, they are probably not fixed to one structure and one type of logic. Different modes of knowing and thinking can be emphasized at different times and at different places. The impact of personal differences, cultural differences and educational traditions becomes greater.

Thus, it is unlikely to find one collective, dominant mode of epistemic orientation among health care practitioners or among educators. Collective profiles may be found in sub-groups and in different schools and traditions, much depending on personal and cultural influence.

4.4.2.3 Collective abilities

The collective of practitioners in education and in health care can also be said to have a common system of abilities, including skills. These are not common in the sense of everyone having the same abilities. Rather, the common system of abilities is made up of the individual abilities of each practitioner in the area.

The common abilities determine the level of procedural knowledge of the collective.

4.4.3 Collective action schemata and implicit theories

Just as individual values, beliefs, and abilities are organized into action schemata and implicit theories, so are the collective ones.

The common practices exercised by a professional group can be conceived as manifestations of common action schemata, i.e. common codes, principles and prescriptions determining how information is acquired, how plans and decisions are made and implemented, and how they are evaluated. The col-

lective action schemata can be viewed as knowledge-in-practice in so far as the practices that manifest them are appropriate with respect to socio-cultural context and situation. Here it must be brought to mind that appropriateness does not mean that the practices be entirely determined by the actual context; appropriate practices also change undesirable circumstances into desirable ones. Appropriate practices manifest and advance valuable conditions - a valuable life-form.

The collective action schemata tend to repeat themselves from time to time and are handed over from one generation of practitioners to another. The values and ideals, models, principles and beliefs that they include compose a collective theory-in-practice. The collective theory-in-practice include various ideals and beliefs related to the practice concerned: a conception of health and sickness, man, society and the world, of learning, teaching and caring. Thus, the elements relate to the socio-cultural as well as the interpersonal level of practice.

Like individual action schemata and practice theories, the collective ones can also be implicit or explicit, latent or manifest. Implicit action schemata and theories are unarticulated and compose, so to speak, a common fund of experience built up be the practitioners. When this common fund of experience is articulated it becomes a common explicit theory that can be used as reflection-in-practice. There are, however, elements in the collective practice schemata that cannot be articulated, only manifested in practice.

Every individual practitioner in health care and in education is part of a collective, bringing his or her practical knowledge to the collective and also interpereting and manifesting the collective's knowledge in his or her own individual mode. Collective practical knowledge would be

impossible without tradition.

4.4.4 Tradition

Tradition is not, according to Wittgenstein (1983, 88), something you can learn or a thread you can pick up when you choose - any more than you can choose your ancestors; not having a tradition one would like to have is like being unhappily in love.

Thus we might say that a tradition is something one is born into. It is apparently not learned in an intentional and systematic way, like one learns how to drive a car or to remember the content in a textbook. A tradition is rather something one grows into without noticing it.

The concept of tradition is central in hermeneutics; actually the mediation of tradition has been viewed as the object of hermeneutics. According to Habermas, tradition hands down a special form of life, including cultural productions and techniques. Tradition has also been said to transmit a "horizon for understanding", meaning that it constitutes some kind of "fore-knowledge" without which no understanding or knowledge of reality is possible. Belonging to a tradition means that one can take part in the continuous dialogue and anticipate meaning; taking part in a tradition expressly means belonging somewhere and being acquainted with life and reality in a special way. It is from this "platform" one understands new meanings and the "horizon" determines what one can understand. After having understood the new meanings they in their turn become part of one's fore-knowledge and determines further interpretations and understanding; this is the hermeneutic circle or spiral. The handing down of a tradition is never a passive process. Every new generation and every individual interprets tradition from a new standpoint - more or less - bringing an element of innovation and creativity to the process. Since

tradition is continuously re-interpreted and modified, the "horizons for understanding" are also continuously widened. Hermeneutics can also include a critical dimension, which especially Habermas has emphasized. This involves critical reflection upon the traditions to which we belong, that is, it includes self-reflection. (Gadamer 1977; Habermas 1966 and 1975; Lindholm 1980, 52-53, 107-108, 115-123; Radnitzky 1970 II, 6, 23-29; Ödman 1979, 7,38)

That practical knowledge is transmitted through tradition has been claimed, for instance, by Polanyi (1958, 53-54, 160; 1964, 15-16, 33). He says, firstly, that an art can not restlessly be specified and articulated. And because of this it cannot be transmitted by prescription, i.e. by conceptually formulated rules. Rather, it is picked up unconsciously through imitation, examples and the acquiring of the hidden rules of the practice or art concerned, that is, through tradition. The transmission of practical knowledge through tradition presupposes submission to authority and uncritical imitation to a certain extent, says Polanyi, but in spite of this, tradition is never handed down unchanged: it is always an interpretation of the past in the context of our immediate problems. Polanyi mentions the practice of science as an art - the art of knowing - that is handed down by tradition. The art lives on only where it is continuously practiced, because the tacit components of practical knowledge exist only in and through practice.

Thomas Kuhn (1970, 40-46, 144-159, 174-210) also analyzes the practice of science in terms of traditions. Practising science - like practising any art - means practising "the rules of the game". The rules, however, are very difficult to discover. They are seldom articulated but rather handed down in education. A specific scientific tradition can be said to include a specific <u>paradigm</u>, including the common beliefs, values and techniques of the scientists.

The paradigm is always collective, it consists of the shared intuitions of a group of scientists and governs the scientific activity of that group. The paradigm is a shared possession. Belonging to a specific tradition means sharing the paradigm - the values, beliefs, intuitions and techniques - of that tradition. The tradition determines what is to be considered as research problems, what methods are to be conceived of as scientific etc. Cumulative research within a specific tradition is what Kuhn calls normal science. Revolutionary science means that there evolves a conflict between rivalry paradigms, ending in the establishing of a new paradigm, which at the same time means that a new tradition is created.

The connection between practical knowledge and tradition is also stressed by J.C. Nyiri (1988), who also points to the unspecifiable, tacit and non-propositional nature of both. Since practical knowledge cannot be communicated through propositions, he says, it needs another form of communication. This form is tradition, which Nyiri conceives of as a series of repetitions of an action. Nyiri distinguishes between primary and secondary traditions, primary traditions meaning traditions that cannot be separated from the way that they are handed over and secondary traditions meaning traditions that in principle can be communicated in a discursive fashion. Nyiri investigates two theses concerning the two types of traditions: the weak traditionalist thesis that claims that there are only secondary traditions and the strong traditionalist thesis, which claims that there are primary traditions. Nyiri himself defends the strong traditionalist thesis.

Barry Smith (1988) widens the significance of practical knowledge to include the society as a whole. He says that the understanding of practical knowledge involves a new understanding of society, of the rules and customs maintained within it.

In this work education and health care have been characterized as forms of life. Referring to Habermas (1966 and 1974, 8-9) we may then say that the role of tradition is to mediate these forms of life. Since the concept of life-forms enters the argument in two ways - the socio-cultural context is conceived of as a form of life and the practices themselves are conceived of as forms of life - there are also two types of traditions involved. Firstly, the practices of education and health care are part of a socio-cultural tradition, which they interpret, re-interpret and mediate in their own way. The socio-cultural level of practical knowledge in these areas can be understood in this very way: it refers to the way in which these practices interpret and mediate the life-form of which they are part. Secondly, the practices themselves are conceived of as forms of life that are mediated through education and practice from one generation of practitioners to another. In both cases knowing the form of life means knowing the tradition in the sense of belonging to it, participating in it - not passively but actively interpreting and re-creating it. In both cases too the strong traditionalist thesis can be defended: these forms of life cannot be mediated discursively. Since they involve tacit components like ways of thinking and knowing, skills and actions, they must be transmitted through practices involving these components.

In this study, practical knowledge has been conceived of as organized into action schemata and practice theories embedded in the practice. This means that when the common practices are handed down to the next generation of practitioners, the action schemata and implicit theories are handed down with them. The action schemata and implicit theories can be compared to Kuhn's paradigm, implying that comprising the collective action schemata and implicit theories means practicing within a specific tradition.

The common, collective practices thus mediate an axiological orientation, an epistemic orientation and a set of abilities. Values and ideals, beliefs and modes of knowing, abilities and skills are re-interpreted and transmitted through examples, imitation, ways of doing and thinking in education and in practice. This may explain, for instance, cultural differences in these practices. Since it is through practice and personal contact that the practices are transmitted, different traditions may evolve at different places, the action schemata, modes of thinking and knowing are different in different traditions. Because the traditions of the practices are integral parts of a socio-cultural context, it is probably also difficult to transfer an element from one context to another.

The mediation of collectice action schemata can thus be conceived of as continuous repetitions of patterns of practice. In this way tradition is on the collective level what habit is on the individual level. Forming a habit was compared by Dewey (1934, 104) to in-habiting the world, making it a home and a part of every experience. Habits, the repetition of actions in similar contexts, can thus be said to contain knowledge of the world. In the same way the forming of a tradition means belonging somewhere and being familiar with life and the world in a special way - a tradition is, in a sense, also a "home". And in the same way as a habit it involves repeating action schemata in similar situations. Thus, traditions also contain knowledge of the world, knowledge that is manifested and maintained in practice, i.e. practical knowledge.

However, as in the case of scientific revolutions, traditions in education and health care may also cease to work. Actually this means that they no longer contain practical knowledge - the repetition of old action schemata no longer manifests or advances a valuable form of life. This may be due to the fact that the world has changed or that other kinds of knowledge - especially scientific knowledge -

starts to question the tradition. Because just as the action schemata and implicit theories in general may contain knowledge as well as ignorance, so may the tradition. A tradition that transmits action schemata that no longer advance a valuable life-form may thus be said to mediate practical ignorance. An innovative and creative attitude to tradition is thus essential. The Swedish writer and critic Bengt Nerman (1982, 120) expresses this in the following way:

> "Tradition, the cultural tradition is not dangerous but nor is it holy - it can be used. It is experience changed into form, a material that the people who have lived before us have created." (My transl.)

In some case an actual revolution can take place in a practice. Then the old tradition is not only re-interpreted. It is abolished and a new tradition is created instead, involving wholly new action schemata and patterns of practice. This may happen if the practice concerned develops into a state of crisis. The new tradition - just as the new paradigm in science - implies a new interpretation of the practice itself and, mutatis mutandis, also a new interpretation of the world; new kinds of problems are perceived, new abilities are developed. The "horizon for understanding" is widened.

A state of crisis within a practice usually calls for a new orientation in Galperin's (1979, 59-88) sense of the word. This involves conscious and intentional reflection upon the tradition and all that it includes. In states of crises there is probably a strong need to make the implicit theories and schemata explicit, to engage in collective self-reflection. Since self-reflection presupposes some kind of concepts and abstractions, it requires that the implicit theories are articulated; self-reflection may also make use of another type of theories - scientific theories.

Just as action schemata and practice theories constitute control systems of individual action, so the collective schemata and theories control collective practice. And in the same way as there is feedback between action determinants and action on the individual level, there is also feedback on the collective level, meaning that while the schemata and theories determine practice they are also modified by practice. This process of modification can take place gradually or it can happen very abruptly, breaking with the tradition, in which case it can be compared to a practical revolution or a shift in paradigm.

The changing of and development of collective practice through a re-orientation and change in traditional schemata can be compared to a learning process on the individual level. The "collectice learning process" thus follows the same stages as the process of experiential learning, put forth by Kolb (1984, 21) (fig. 4.10).

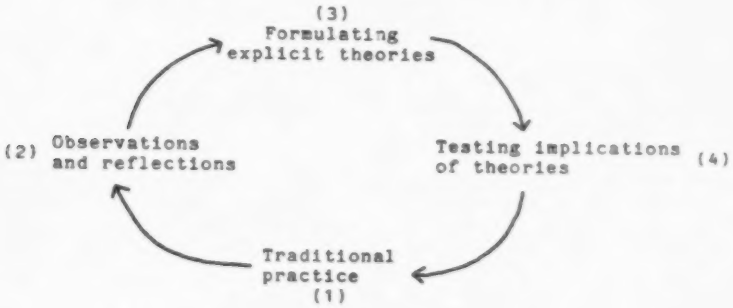


Figure 4.10 The collective learning process (modification of Kolb 1984, 21)

In figure 4.10 Kolb's model has been turned upside down, but the stages follow in the same order as in the original model. This change has been done in order to point out the similarity between this model and the action model used in this study.

4.5 Concluding definitions and comments

The purpose of this chapter was to investigate and argue for theses I and II of the study, namely that the role of knowledge in an interactive practice is to guide practice and that knowledge consists of value-knowledge, factual knowledge and procedural knowledge, articulated and unarticulated knowledge.

In this study practical knowledge has generally been defined as knowing how to educate and to provide health care. Practical knowledge is at the same time manifested in something and a manifestation of something.

Practical knowledge is manifested in appropriate action in education and health care. Appropriate action again means manifesting and advancing a valuable form of life, which implies that the practices of education and health care themselves be seen as moral forms of life - the whole purpose of these practices is to contribute to a better life in form of respect and solidarity, health and education, dignity and a good death. Practical knowledge is manifested in concrete interpersonal situations in the different phases of the action sequence, in "reading" and "flexing" and in knowing how to interact instrumentally, strategically, communicatively, expressively and discoursively.

Since practical knowledge is manifested in appropriate action while practical ignorance is manifested in inappropriate action, we may conclude that the role of this knowledge is to guide action so that the practitioners in education and health care act appropriately and not inappropriately - so that they actually do manifest and advance a valuable form of life.

Practical knowledge can be said to be organized in action schemata and implicit practice theories, which in their turn manifest value-knowledge, factual knowledge and proce-

dural knowledge, i.e. values and ideals that can be universalized, empirically, rationally or metaphorically true beliefs, the required abilities and skills. In this sense practical knowledge can be said to be a manifestation of the types of knowledge formulated in thesis II.

Practical knowledge can be either unarticulated or articulated. When it is articulated it becomes explicit. Practical knowledge is seldom entirely implicit or entirely explicit; some factors are in principle impossible to articulate.

When elements of practical knowledge are made explicit, they are formulated in explicit practice theories. The role of knowledge articulated in explicit practice theories is also to guide practice; the explicit practice theories can be used as means of reflective orientation, while the implicit theories work as unreflective orientation.

Practical knowledge can be individual as well as collective. As collective it is organized in common schemata and theories that are manifested in common, repeated patterns of practice. These common schemata and theories, manifesting common value-orientation and epistemic orientation and common abilities, have evolved through tradition, which is the main channel for maintaining and mediating practical knowledge. Through tradition the individual practitioner is introduced in the life-form of the practice; he interprets and modifies the common fund of knowledge in his own way. Through tradition the individual practitioner can also get his share of the experiences built up by previous generations of practitioners.

However, tradition not only includes the common fund of knowledge built up by previous generations, it also contains common misconceptions and prejudices. And, moreover, action schemata and theories that worked in the past do not

necessarily do so forever. Sometimes it is enough to re-interpret and modify traditions, sometimes traditions must be abolished and replaced by new ones.

Learning takes place when inappropriate action schemata and theories are modified or replaced by new ones that determine and orient action in a more appropriate way. This takes place individually as well as collectively. Learning involves a re-orientation of action that may be necessary because of changes in the world, in the practice itself or in the knowledge available. Scientific research plays an important part in the re-orientation of action.

The role of science with respect to interactive practices like education and health care will be treated in chapter 6. Before that some comments on theoretical knowledge may be necessary.

5. ON THEORETICAL KNOWLEDGE AND ITS RELATIONSHIP TO PRACTICAL KNOWLEDGE

Among the problems of this study was mentioned the question of the relationship between theoretical and practical knowledge in interactive practices like health care and education. No thesis was formulated with respect to theoretical knowledge, since, as will be argued here, theoretical knowledge is involved in practical as well as scientific knowledge. It is thus included in the theses concerning these kinds of knowledge. However, the question of theoretical knowledge and its relationship to practical knowledge is given a chapter of its own, because it focuses on a specific domain of practical and scientific knowledge.

The concept of theoretical knowledge has been touched upon in various contexts in this study, bringing out different meanings of the term. Theoretical knowledge, on one hand, has been characterized as knowing that or propositional knowledge. On the other hand, theoretical knowledge can also be conceived of as knowledge organized in theories, in which case it concerns implicit as well as explicit theories, practice theories as well as scientific. These two ways - or actually three, because knowing that is not necessarily synonymous with propositional knowledge - of approaching theoretical knowledge may lead to different ways of conceiving the relationship between theoretical and practical knowledge.

5.1 Theoretical knowledge as knowing that or propositional knowledge

Theoretical knowledge has been defined as knowing that by several authors referred to in this study. These authors have usually equated knowing that with propositional knowledge.

Hintikka (1965; 1974, 28-31), for instance, seems to mean that 'knowing that' is the same as 'propositional knowledge'. In his analysis of the conception of knowledge among the Ancient Greek, he also sees this type of knowledge as 'knowing what' or 'knowing the definition'. According to him Socrates and Plato saw this type of knowledge as necessary for techne, while Aristotle made a clearer distinction between theoretical and practical knowledge.

The term 'knowing that' is used also by Ryle (1958, 49-57) to refer to propositional knowledge but he also uses it to cover prescriptions and sees 'knowing that' and 'knowing how' as two quite distinct types of knowledge. Theoretical knowledge as 'knowing that' and 'propositional knowledge' is also found in Hartnett and Naish (1976, 107-121), while Pring (1976, 16-24) characterizes 'knowing that' as belief-type of knowledge.

'Knowing that', 'propositional knowledge' and 'prescription' however need not mean the same thing. 'Knowing that' seems to correspond to what has been called factual knowledge or true beliefs in this study. These true beliefs need not be propositional. They may as well be implicit, i.e. not expressed in propositions.

In the account of practical knowledge in the previous chapter, practical knowledge was said to be organized into action schemata and implicit theories, manifesting value-knowledge, factual knowledge and procedural knowledge. This view of practical knowledge implies that practical knowledge manifests 'knowing that', i.e. true beliefs. Appropriate action presupposes theoretical knowledge in the sense of true beliefs about the situation, the socio-cultural context, one's own strengths and weaknesses etc. In short, practical knowledge is a manifestation of knowing what is the case.

The crucial point is that this knowledge is not necessarily articulated and explicit. As has been argued in this study, an actor's beliefs, as well as his ideals, may well be organized into action schemata and implicit theories that are manifested in action but that he cannot himself articulate explicitly.

The term 'propositional knowledge' thus seems to correspond more closely to knowledge that in this work has been characterized as articulated and explicit, primarily to knowledge articulated in everyday language or theories, since, as has been argued, knowledge can also be articulated in works of art. Another word for 'propositional knowledge' would then be 'conceptual knowledge'.

Finally, propositions are not the same thing as prescriptions. Propositions state what is the case and can thus be said to express conceptual theoretical knowledge. Prescriptions, on the other hand, say what should or should not be done, how one ought or ought not to act. It is a type of conceptualized practical knowledge, since it is action knowledge expressed in conceptual prescriptions. However, since the term 'practical knowledge' has been defined as knowledge manifested in action, another term is needed for this type of knowledge. The term 'action knowledge' could be used here. Thus, action knowledge can be defined as knowledge related to appropriateness and inappropriateness of action. This knowledge can be practical, i.e. manifested in action, or conceptual, i.e. articulated in prescriptions.

Thus it seems that the authors referred to here have used the term 'knowing that' in two distinct ways: 1) as knowing what is the case (factual knowledge, true beliefs) and 2) conceptual knowledge (propositions and prescriptions). As has been pointed out here these two meanings are not synonymous.

5.2 Theoretical knowledge as knowledge organized in theories

It might be assumed that the term 'theoretical knowledge' have something to do with theories.

Two kinds of theories have so far been treated in this study: implicit practice theories and explicit practice theories. Both kinds of theories consist of the same elements - values and ideals, beliefs and principles - but they differ with respect to how they are expressed. Implicit theories are manifested in action while explicit theories are articulated conceptually. An implicit theory is always practical, since it is manifested in practice. An explicit theory is also practical, if it is used as a means of reflective orientation in practice.

If by theoretical knowledge is meant knowledge organized in theories, two more kinds of theoretical knowledge can be discerned, both of which are also practical, namely knowledge organized in implicit practice theories and knowledge organized in explicit practice theories.

In the next chapter still another group of theories will be studied - scientific theories. These are theories constructed on the basis of research. This means that theoretical knowledge can also mean knowledge organized in scientific theories. If a scientific theory is used in practice it is also practical.

Thus the term 'theoretical knowledge' seems to have a variety of meanings. According to some of the meanings it is something quite different from practical knowledge. Other interpretations again see theoretical knowledge as a prerequisite for practical knowledge while others still conceive of different types of theories as related to practice in different ways.

5.3 Theoretical knowledge as practical and non-practical

The idea that theoretical and practical knowledge are not separate but rather inextricably intertwined in one another has been advanced by Hintikka (1974, 80-96). He claims that theoretical knowledge, knowing that, can be part of practical knowledge but that it does not exhaust the notion of practical knowledge. Knowledge of the causal connections leading up to a desired result may for instance comprise an important part of practical knowledge. Hintikka uses the term 'intentional knowledge' or 'informed maker's knowledge' for practical knowledge that involves theoretical knowledge. He refers to Anscombe (1958, 82-89), who also include an element of theoretical knowledge in practical knowledge; practical knowledge involving theoretical knowledge means knowing what one is doing or acting intentionally:

> "Although the term 'practical knowledge' is most often used in connexion with specialised skills, there is no reason to think that this notion has application only in such contexts. 'Intentional action' always presupposes what might be called 'knowing one's way about' the matters described in the description under which an action can be called intentional, and this knowledge is exercised in action and is practical knowledge." (Anscombe 1958, 89)

Acting intentionally, then, means to act and to be able to describe one's own action or, more precisely, to be able to give an account of one's intention as well as acting on that intention (Anscombe 1958, 84-88)

The importance of theoretical knowledge for practical knowledge is also emphasized by Entwistle (1976). In the same way as Hintikka he seems to mean that theoretical knowledge may be an important element in practical knowledge but that it is not enough to account for practical knowledge:

> "Our conclusion is that the tacit component at the heart of all skills makes learning by practice an essential condition of mastery. It also signals caution against claiming too much for the role of theoretical explanations in teaching technical and

> professional skills. On the other hand, reasons have been advanced for believing that theorizing may helpfully precede and accompany practical learning and for the view that knowing how to do something intelligently often depends upon reference to theoretical knowledge about the contexts in which a skill is practised. Similarly, a proper understanding of the contingent experiences of daily life depends upon the acquisition of a considerable cognitive repertoire." (Entwistle 1976, 50)

The idea of seeing practical and theoretical knowledge as intertwined in one another suits the purpose of this study well. For one thing, it has been argued that practice constitutes the a priori of knowledge. This implies that it is also the a priori of theoretical knowledge. Secondly, different types of knowledge, including 'knowing that' and implicit as well as explicit theories, have been discerned as elements of practical knowledge.

The conception of theoretical and practical knowledge as being intertwined also has to do with the large view of practical knowledge that has been advanced here. As Anscombe (1958, 89) also points out, 'practical knowledge' is a larger concept than 'specialised skill'. In this work the term 'procedural knowledge' has been used to refer to more limited abilities and skills, while 'practical knowledge' has been used as knowledge manifested in complex practices, involving different types of knowledge - values and ideals as well as beliefs, principles and abilities. According to this view theoretical and practical knowledge need not be opposed to each other. Rather, highly developed practical knowledge presupposes theoretical knowledge.

The following definitions of 'theoretical knowledge' and 'practical knowledge' can now be offered.

> Theoretical knowledge is a view or conception of the world or some part of it. This view consists of a set of components and a set of relations between these components.

Theoretical knowledge in education and health care consists of a view or conception of the main components involved in these practices and of the relationships between these practices. This view involves descriptive as well as prescriptive elements: it is both a view of what is the case in these practices and of what should be the case.

Practical knowledge in education and health care consists of a set of implicit action schemata and implicit practice theories, manifested in appropriate action.

According to these definitions theoretical and practical knowledge are not incompatible. Rather, practical knowledge is always a manifestation of theoretical knowledge. We might say, as also Hintikka (1974, 80-96) and Entwistle (1976) point out, that theoretical knowledge can be seen as a necessary but not sufficient prerequisite of practical knowledge.

This definition of theoretical knowledge does not specify how this knowledge is to be expressed. This offers at least the following options.

Theoretical knowledge can be implicit and unarticulated, manifested only in appropriate action.

Theoretical knowledge can be conceptualized by making the implicit theories explicit.

Theoretical knowledge can be conceptualized formulating scientific theories, based on research.

Thus, theoretical knowledge in education and health care can be manifested in practice as well as conceptualized in the form of propositions and prescriptions, models and scientific theories.

That theoretical knowledge is practical means that it is "in-practice", manifested in action in one way or the other. Theoretical knowledge can be "in-practice" in mainly two ways:

> "Theoretical-knowledge-in-practice" can involve the manifestation of an implicit and unarticulated view of the main components, relations and principles in practice.
>
> "Theoretical-knowledge-in-practice" can involve the use of a conceptualized view of the main components, relations and principles as means of reflective orientation in practice.

These two ways are the same as are depicted in figure 4.9 as implicit and explicit theories in action.

Thus, there should be no doubt that theoretical knowledge can be involved in practical knowledge. However, this does not imply that theoretical knowledge is always "in-practice" in this way.

An educator, for instance, may have acquired theoretical knowledge from books or lectures that in no way influences his teaching practice. He can repeat, describe and maybe analyze the propositions and prescriptions but he can make no use of them in his own teaching. Since repeating, describing and analyzing can also be viewed as forms of activity, this educator's theoretical knowledge is in a way "in-action", he can, for instance, use it in talk and discussions. But since he cannot use it in his teaching practice, it is not practical, "in-practice", in the sense that this term has been used here. We can call this knowledge <u>non-practical</u>.

An educator or care provider may thus have many types of theoretical knowledge simultaneously. In his practice he may manifest one theory, which he cannot articulate - or

which he has not so far articulated - and conceptually he may know another theory, which he cannot use in practice: he knows practically what he does not know conceptually and he knows conceptually what he does not know practically.

Since an actor can manifest one theory practically and express another conceptually, it is also possible that one or the other is true while the other is not. The case of Ignaz Semmelweis can illustrate this (the case is related e.g. in Rosing 1978, 28-37). The Hungarian doctor Ignaz Semmelweis worked in Vienna in the middle of the nineteenth century. He managed - after many trials and errors - to lower the percentage of women dying in childbirth at the General Hospital by demanding the doctors to wash their hands in a chloride solution before they examined the women that had given birth. The doctors usually examined the women after having conducted obductions, washing their hands only with soap and water before the examination. The new method was successful. In the terminology used in this study we can say that the doctors washing their hands in a chloride solution manifested practical knowledge - it was the appropriate thing to do. Thus, the implicit theory was also true. The conceptual explanation was however not correct. According to Semmelweis' theoretical-conceptual explanation, the doctors transferred some kind of "corpse substance" from the obducted bodies to the women; the women obducted had also died in childbirth. Thus, knowledge that works in practice is not necessarily accompanied by a scientifically true explanation.

The distinction between theoretical knowledge in practice and theoretical non-practical knowledge also brings us to the difference between manifesting theoretical knowledge and applying theoretical knowledge that was envisaged previously (p.120).

5.4 Manifesting and applying theoretical knowledge in practice

What it means to manifest knowledge in action has been investigated quite largely in chapter 5. It means acting appropriately, which again means that correct action schemata and theories are implicit in action. This knowledge exists in practice, not as a separate element outside practice.

When theoretical knowledge is applied to practice, knowledge must first exist in some other way and then be applied. For instance, when students learn things conceptually in class and then go out to apply in practice what they have learned. Several factors may render this type of knowledge difficult to apply:

1. The student is unfamiliar with the practical situations and cannot see the connection between the concrete reality she is confronted with and the conceptually organized view. It is probably not irrelevant in what kinds of situations knowledge is acquired. If conceptual-theoretical knowledge is learned in classroom situations and has been used only verbally and in tests, the knowledge may easily become tied to similar situations. The practical situation, e.g. a hospital ward or a health care center, is quite different and knowledge does not transfer automatically from one situation to another. The student must learn to "read" the new situations if she is to apply conceptually organized knowledge in them.

2. The student lacks the necessary abilities or skills for application. This illuminates the point that practical knowledge does not require only a correct theory-in-action but also the necessary-abilities-in-action. Thus it is possible that the student is familiar enough with the situations to be able to "read" them and that she conceptually also knows what should be done - if someone asks her, she can answer - but she just cannot do what the situation requi-

res. Lack of ability and skill can be due to lack of practice or talent.

These factors can be called internal obstacles to application, because the obstacle is within the actor himself. How these internal obstacles are to be overcome is a major pedagogical problem in the education of practitioners in education and health care and cannot be dealt with extensively here. However, the ideas presented here point to the importance of continuously relating conceptually learned knowledge to concrete sitations and to practising the skills required. The application of knowledge to practical situations is something that in itself must be practised.

In addition to these internal obstacles to application two more factors can be mentioned:

3. External obstacles like lack of necessary equipment or lack of economic resources. For instance, a doctor may realize that his patient needs a kidney transplant and he may also himself have the skills necessary for such an operation. If, however, there is no suitable kidney available, he cannot apply his knowledge in action.

4. Finally, there may be something wrong with the theory. A theory may, for instance, be so general and abstract that it has no practical implications. This has appeared to be a problem in nursing, where quite a few so-called conceptual models and theories have been developed. Research in the area has however shown that many of these models and theories are difficult to relate to practical situations because of their abstract and general nature (see e.g. Kaila-Behm 1988 and Walton 1986). Another problem with the theory may be that it is illogical or empirically false. If it is illogical and inconsistent, it does serve the purpose of making practice intelligible - on the contrary, efforts to apply an illogical and inconsistent theory may obscure reality and make it more or less unintelligible. If the theory is empirically false, application may be impossible

or it may lead to undesirable results. In short, if a scientific theory is to be applied in practice, it must meet the criteria of a good theory (see e.g. Chinn & Jacobs 1983, 131-145, Meleis 1985, 156-163 and Stevens 1979).

If the application of conceptually known theory succeeds, it too becomes practical.

5.5 Concluding comments

According to the view presented here there is not necessarily any conflict between theoretical and practical knowledge. All practical knowledge necessarily involves theoretical knowledge but all theoretical knowledge does not necessarily involve practical knowledge.

If there is a conflict, it is more likely to concern the relationship between practical and conceptual knowledge, because these can exist quite independent of each other. What is known practically need not be known conceptually and vice versa.

6. SCIENTIFIC KNOWLEDGE IN INTERACTIVE PRACTICES

In the previous chapter scientific knowledge was quite generally referred to as a special type of theoretical knowledge, that is, as knowledge organized in systems of propositions and prescriptions called theories. Thus the whole question of scientific knowledge could have been treated together with the other types of theoretical knowledge. The problem of scientific knowledge in interactive practices, on the other hand, is associated with questions that concern these sciences and research areas more generally, which supports the decision to treat the problem of scientific knowledge in a separate chapter.

This chapter deals with theses III and IV of the study, namely the theses that science in interactive practices is a way of articulating and creating knowledge that can be used as internal action determinants in the practice concerned and that the theories in interactive practices have a direct or indirect practical purpose. These theses are supported by the pragmatistic-constructivistic view of knowledge outlined in chapter 2 and by the conception of research as an auxiliary or support system for practice, outlined in chapter 3.

The view of scientific knowledge in interactive practices must, however, build upon a conception of science and research in general.

6.1 Process and product in science

In studying the nature of science, we may approach the the problems in two ways. The main interest can be focused on the process of science, i.e. research, or on the product, i.e. knowledge - primarily organized in theories. Process and product are not independent of each other: the main criterion of what is to be called scientific knowledge

is that it has been created in and through a process that meets the criteria of scientific method. (See e.g. Bunge 1967, 3-45 and Niiniluoto 1980, 13)

6.1.1 Science as action system

The process of scientific research can be described as an action sequence. This was already suggested in chapter 3, where research was conceived as a support system for education and health care. The research process can then be described as proceeding through the same action phases as action in the primary practices (fig. 6.1).

In studying science as an action sequence attention can be focused on the individual researcher as an actor doing science or on the whole collective of scientists involved in a common practice. What is also brought out by viewing research in terms of this general action model are the internal and external action determinants that influence and are manifested in the scientific process. This is in accordance with the general view of knowledge presented in chapter 2: knowledge is not something that is passively received from outside and that is independent of the knowing actor, it is actively created in the interaction between actor and environment; what is to be considered as knowledge is then dependent on factors belonging to the action system as well as on factors belonging to the situation where knowledge is created.

Polanyi, Kuhn and Hunt have stressed thoughts along these same lines.

Polanyi (1958, 1959 and 1964) emphasizes the personal factor in science, as well as in knowing in general, which has also been pointed out previously in this study. Science, facts and theories according to him are always created by

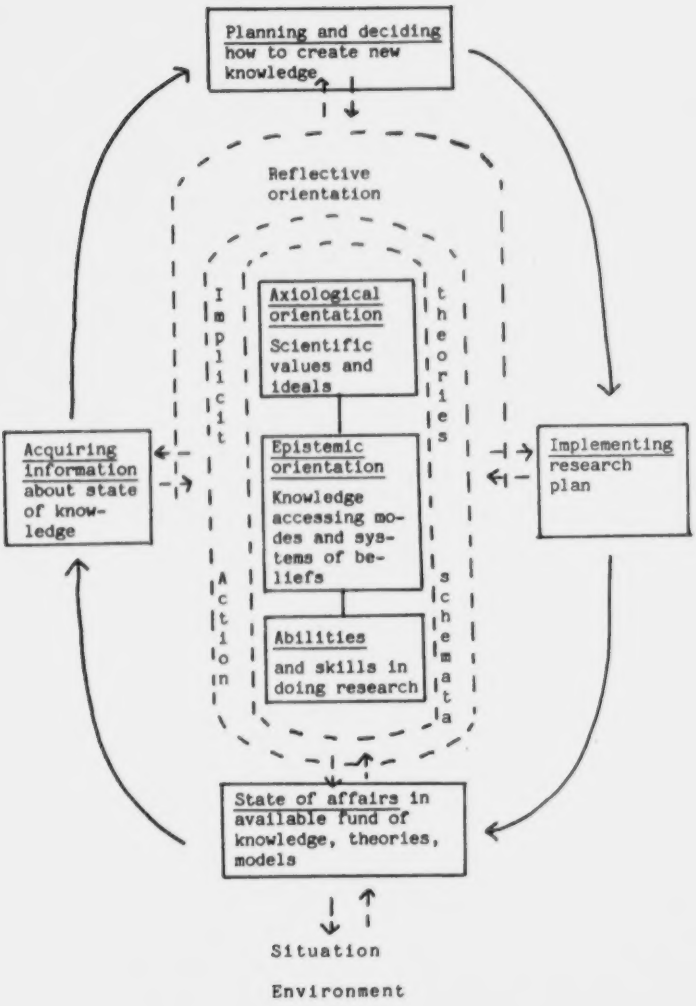

Planning and deciding how to create new knowledge
Reflective orientation
Implicit Action theories schemata
Axiological orientation
Scientific values and ideals
Epistemic orientation
Knowledge accessing modes and systems of beliefs
Abilities
and skills in doing research
Acquiring information about state of knowledge
Implementing research plan
State of affairs in available fund of knowledge, theories, models
Situation
Environment

Figure 6.1 The research process as action system

individual scientists, i.e. human beings. Doing research means mastering the art of knowing, an art that requires personal involvement like commitment, intellectual passion and skill.

Kuhn (1970) emphasizes the collective action system rather than the individual in his theory of scientific paradigms. The collective paradigm, consisting of values, beliefs and methodological priorities determines what kind of knowledge is to be created. With the change in paradigm the prerequisites for creating new knowledge change.

Hunt (1977, 1983a and 1987, 105-113) again stresses the personal component as well as the external situation as factors determining research. He points out that a specific theory cannot be isolated from the person who creates and from the specific historical and cultural context where it is created. According to him this concerns theories in all sciences but especially theories of human affairs. Hunt also claims that the fact that e.g. psychological theories have had so little influence on practice is due to negligence of this insight:

> "Writing about generalized abstractions, e.g. 'System I functioning is characterized by...' we created the illusion of generality across the cultures and time. I do not mean that we conspired to create these illusions; we were simply following standard convention in the so-called behavioral sciences. I have come to realize that this false presentation of psychological theories, out of context of their personal genesis and their meaning in time and place, detracts from their value, and virtually ensures that they will not influence practice." (Hunt 1983a, 11)

Thus, scientific theories, as well as other types of knowledge, are the result of interaction between man and environment, where action constitutes the a priori of knowledge.

According to figure 6.1 the the work process in science goes

through the same phases as other action sequences. This can be illustrated by an example.

Example 4

A researcher, who has studied the relationship between theory and practice in different areas of health care education for quite some time, has come to realize that there are very few theories on how learning actually takes place in practical contexts.

Acquiring information. In having realized the lack of theory in the area of practical learning the researcher has already acquired a good deal of information. This is quite natural, because an action sequence never starts from zero. It is just a link in a long series of sequences. However, after this insight the researcher starts to gather information on this problem systematically, going through abstracts, indexes, periodicals and research reports. In this way she gets a picture of what is already known and where the gaps are. She concludes that what is needed, to begin with, is a good description of how learning in practical contexts takes place that would identify the main variables involved.

Planning and deciding. After that the researcher starts planning her study. Since she is not yet going to identify relationships or test hypotheses but rather to identify and describe the main variables involved she settles for a project involving observations, interviews and accounts in combination with critical incidents. She writes a research plan including all the necessary components and gets the required permission and means for the study.

Implementation. Implementing the research plan involves carrying out the study as well as writing a research report and communicating the findings. In this case the researcher has identified a set of variables that she concludes to be important to learning in practical contexts.

New knowledge/evaluation. The researcher herself as well as the scientific and practical community can then evaluate the significance of the knowledge created in this study: in what way has it contributed to our knowledge in this area? The researcher probably goes on to plan her next study, involving an inquiry into relationships between the variables identified.

In going through the research sequence the researcher's decisions are influenced by internal as well as external action determinants.

Axiological orientation. The researcher is guided by a set of values and ideals concerning the process she is involved in. First of all, she is guided by scientific values like truth, objectivity and honesty: her primary concern with the project is to find out what variables are involved in learning in practice situations. Secondly, she may also be guided by practical values and ideals: ultimately she may hope that the knowledge she creates will be useful in health care education. A pre-requisite for this is, however, that her research follows the scientific ideals. If her results are true and objective it is more likely they will also be useful.

Epistemic orientation. The researcher's epistemic orientation consists of her knowledge accessing mode and of the beliefs she has established up to now. These beliefs concern the nature of the research process she is involved in but also the phenomenon she is investigating. Ultimately her beliefs include beliefs about man and the world.

Ability. In order to carry out the whole project and proceed through the sequence the researcher needs different kinds of abilities and skills. She needs ability to grasp and formulate research problems, ability to make a realistic research plan and ability to carry out the investigation and to describe and interpret the result. In order to to do this she needs, for instance, skill in observing, skill in reasoning and analyzing, skill in reading and writing, etc.

The researcher's axiological and epistemic orientation as well as her abilities are organized into action schemata and implicit theories. The action schemata include different kinds of operations involved in doing research and the implicit theories include her values and ideals, beliefs and principles concerning research as well as the practice she is investigating. She probably also has explicit theories concerning these practices, which she uses consciously as reflective orientation when she makes her decisions.

The researcher's decisions are also influenced by external action determinants. In planning how to carry out the research she must take into account the context and the situations where she is going to gather her data. It is also possible that she will not get all the data she wants or that she will have to change her timetable due to changed circumstances.

Thus, research is also a form of practice and viewed as practice it follows the same principles as any practice.

Much of what has been said about the primary practices can accordingly also be said about scientific practice. Some features may be pointed out:

1. Scientific practice is a creative activity. This means that it is not possible to predict the exact result of the research process - if it were, the whole process would be unnecessary. It also means that it is seldom possible to implement the research plan in detail as it has been formulated. Implementing the plan always involves unforeseen situations, interaction with other people etc., which may require a revision of the plan. In this practice too every phase constitutes an action sequence of its own and movement may also occur in different directions in the sequence. In short, the practice of science is a continuous process of insights and frustrations, trial and error, revising and abolishing old theories, formulating new ones, through which knowledge is continuously created by individuals and collectives in time and place.

2. Scientific research is a manifestation of different degrees of practical knowledge and practical ignorance in doing research. Practical knowledge manifests itself as appropriate action in the various phases of the process and it is organized into action schemata and implicit theories. The action schemata and implicit theories organizing practical research knowledge again are manifestations of an axiological orientation, an epistemic orientation and a set of abilities.

3. The action schemata and implicit theories in research can be conceived as paradigms - this parallel was also pointed out in the analysis of action schemata and implicit theories in the primary practices. On the collective level science in a specific area is a manifestation of a common paradigm, a common way of conceiving research problems, common values, principles and beliefs and common methodological priorities. The individual researcher, being part of the scientific community, usually exhibits a similar

paradigm in his or her research practice.

4. The research paradigms involve both elements that can be articulated in concepts, propositions and prescriptions and elements that cannot be articulated. To formulate the elements that can be articulated is one of the tasks of meta-science.

5. The practical knowledge in doing research is maintained and mediated in practice and personal contacts. Like other practices science lives on in its own traditions. Since the practical knowledge in research involve elements that are not conceptualized - some of which are not even possible to conceptualize - tradition becomes a necessary channel for communicating this knowledge. As was pointed out previously this has been emphasized by Polanyi (1958, 17, 49-65) as well as Kuhn (1970, 40-46). Polanyi also says:

> "The rules of research cannot usefully be codified at all. Like the rules of all higher arts, they are embodied in practice alone." (Polanyi 1964, 33)
>
> "The art of scientific work is so extensive and manifold that it can be passed on from one generation to the next only by a large number of specialists, each of whom fosters one particular branch of it. Therefore science can exist and continue to exist only because its premisses can be embodied in a tradition which can be held in common by a community." (Polanyi 1964, 56)

6. Science can develop within a specific tradition but sometimes new traditions are created; this was described by Kuhn (1970) in his theory of normal science and scientific revolutions, i.e. doing research according to a traditional paradigm or shifting the paradigm, which then also involves a shift in the conception of the science concerned and of the phenomena investigated.

Thus, the practice of science resembles in many ways the primary practices as they have been described in chapter 5. What distinguishes science from the previously analyzed practices is, however, that the practice of science has its own specific goal - scientific knowledge.

6.1.2 Scientific knowledge

At the beginning of this chapter scientific knowledge was characterized as a special type of theoretical knowledge - it is theoretical knowledge produced by research and articulated in conceptual systems.

In the previous section the research process was described in terms of a practice. However, what makes the outcome of this practice scientific knowledge is the use of the scientific method. Since this method is described and discussed in many standard works on science and research it will not be dealt with very deeply here. The main criteria of scientific method are usually considered to be objectivity, criticism, autonomy, fallabilism and progessivism (Bunge 1967, 4; Ketonen 1981, 14, 27; Niiniluoto 1984, 24-29, 35; Tuomela 1983, 113-116).

The knowledge thus produced is usually organized into a theory. According to Bunge (1967, 4, 27) theories are the core of science and they organize facts into patterns or laws. He says:

> "A science is a discipline using the scientific method for the purpose of finding general patterns (laws) (Bunge 1967, 15)."

The general criteria of scientific method can surely be accepted in all sciences. Or maybe it would be more correct to say that they should be accepted, if we want to call something science. Since, ultimately, these criteria can be considered as normative and based on agreement: they are the scientific community's agreement on which criteria are to be met when calling something science or scientific knowledge.

The nature of the theories that are to be conceived as scientific is, however, not self evident. Bunge's view

that a theory organizes facts into patterns seems general enough to allow for different types of theories. When he specifies these patterns into laws, he seems to limit the patterns to a specific type. Theories specified in this way cover for example causal theories but not necessarily hermeneutic interpretations. However, hermeneutic interpretations can well be conceived as facts organized into patterns.

Different kinds of theories and patterns will be discussed more extensively later, when theories in interactive disciplines are treated. For the time being a scientific theory will quite generally be characterized as a set of concepts and sentences, constructed according to the scientific method, that organize a set of data into a pattern. This characterization makes it possible to identify different types of theories.

What is required of a theory, in addition to being justified by the scientific method, is that it specifies some kind of relationships between data, concepts and sentences. Pörn (1985) has put forth a model that specifies the relationships between data, concepts and theory (fig.6.2).

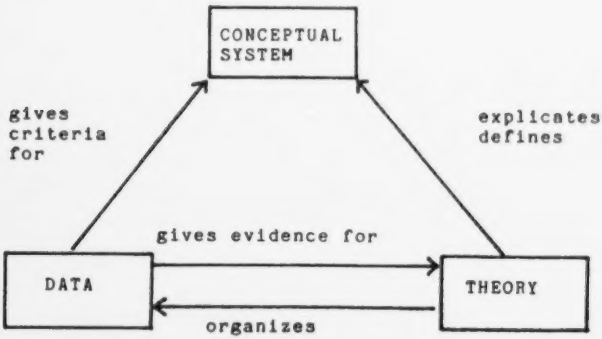


Figure 6.2 The relationships between data, concepts and theory (modification of Pörn 1985)

One change has been made in the model in figure 6.2 compared to Pörn's original model. The arrow going from theory to data only represents theory as organizing data without specifying what this means. This change has been done in order to allow for different possibilities.

The model can be understood as follows. Every theory is made up of a conceptual system and the concepts are defined and explicated by the theory. The theory is also related to a set of data that it organizes, e.g. by explaining relationships within the set of data. At the same time data gives evidence for or support to the theory. The concepts defined by the theory must also be related to data if the theory including the concepts be supposed to propose something about those data. Thus, data gives criteria for the concepts defined by theory. (See also Pörn 1985)

This model is applicable to all so-called factual sciences, that is, sciences that deal with the empirical reality (see e.g. Bunge 1967, 21-24). Sciences investigating education and health care belong to this category.

Knowledge organized in this way can be analyzed mainly in two ways. Bunge (1967, 15, 29) classifies them into rational or conceptual and empirical analysis. The rational or conceptual analysis deals with the logical relationships between the sentences in the theory and with definitions of and relationships between concepts. Empirical analysis deals with data and its relationships to concepts and theory.

Thus, scientific knowledge organized in theories contain both kinds of truths that were discussed previously (pp. 26-27, 29-30), namely a prioric and a posterioric, formal and empirical or material. These two types of truths thus correspond to the conceptual and the empirical side of the

scientific theory, respectively (see also Eskola 1975, 164-172, Kaila 1939 and Niiniluoto 1980, 219-228). A scientific theory cannot do without either one of these aspects. Purely conceptual reconstructions about the empirical world are - as Bunge (1967, 29) says - unprovable. This is another way of saying that pure rationalism does not apply to the empirical world.

According to the modified constructivistic-pragmatistic view of knowledge presented in chapter 2 the theories thus constructed are created in the interaction between man and his environment. As socio-cultural products they are part of World 3 and have in that gained status as controlling factors in the further development of the world.

Since the theories are constructed by actors, in and through action, action is also a prioric to theory. Theories are constructed through research and research is action: it means experimenting, testing, gathering data, analyzing data, conducting surveys and field studies, asking questions, constructing and validating questionnaires etc. Thus, knowledge is arrived at through a series of more or less complicated operations. Knowledge is always verified or falsified by action. This was the point also made by Rescher in his The Primacy of Practice (1973).

The scientific principles can thus be considered as practical. The whole endeavour of science is, after all, a construction of generations and collectives of actors. In the same way as knowledge in general is constructed in and through action and then becomes a determinant of further action, scientific knowledge too is constructed in and through action and then becomes a control mechanism for further action and practice. However, scientific theories do not influence practice as straightforwardly as knowledge gained in the actual practice situation, since it is, after all, constructed by another type of action, in a

different context.

The pragmatistic - or should we say neo-pragmatistic - view of science advocated by Rescher and also adopted in this study does not mean that the role of scientific theories be always and only to give action recommendations. This is the conception of the so-called behaviouralistic view of science as opposed to the cognitivistic view, which sees the construction of a scientific world view as the primary purpose of science (see Niiniluoto 1980, 64-67). According to Rescher's (1973, 3-4) view the construction of a scientific world view can be said to correspond to the theoretical purpose of science. But, since science ultimately is founded on principles of practice, the scientific world view is also "practical" although it does not include action recommendations. This is why a "theoretical" theory - if it is true - also has practical significance (see also Niiniluoto 1980, 67).

One of the conclusions in the previous chapter was that all practical knowledge necessarily involves theoretical knowledge, since action is always a manifestation of a conception of the world and of principles about how to act in the world. The theoretical task of science is to refine and widen our explicit and articulated view of the world. This can be done without any practical purpose, but a scientific world view can none the less be used as a means for reflective orientation in different areas of human action.

What has been said about scientific knowledge so far has been quite general. When attention is turned to the practices of education and health care and to the role of theoretical and scientific knowledge in these areas the situation becomes more complicated. Since these practices are very complicated, involving all "three worlds", the nature of the theories become very complicated too. Further-

more, in studying the sciences of education and health care we deal with two practices, education or health care on the one hand and research on the other hand, and the relationships between them.

6.2 The sciences of interactive practices

What has been said about science and scientific knowledge in general must also apply to the sciences of the interactive practices, if they are to be considered as sciences. However, because of the complicated nature of these practices, the sciences too become complicated.

6.2.1 Attempts to classify the sciences of interactive practices

According to the frame of reference for this study, oultined in chaper 3, science and research in an interactive practice discipline is to be conceived as a second order, auxiliary practice with respect to the interactive practice concerned. This makes these sciences more difficult to characterize and define than the traditional basic sciences. The main point advanced here is that the sciences of interactive practices should be conceived as practical sciences and that practical sciences cannot be classified and defined in the same way as basic sciences. However, nor is a practical science the same as applied science. Some of these ideas were shortly introduced in chapter 3, where the concept of an interactive practice discipline was characterized. This chapter will focus on the sciences within these disciplines, the sciences being only one system in the discipline as a whole.

Before the concept of a practical science is outlined, some of the attempts made to classify the sciences of education and health care according to basic sciences or applied science will be investigated.

6.2.1.1 General classifications of sciences

The attempts to classify the sciences of education and health care according to basic or applied sciences usually take their point of departure in general classifications of sciences.

One general system of classification is presented by Bunge (1967, 21-26) (fig. 6.3). He distinguishes, first of all, between basic sciences and applied sciences. What distinguishes these types of sciences from each other is, according to him, the goal: the basic sciences have a purely cognitive aim while the applied sciences have a practical aim. The basic sciences are then divided into formal and factual sciences, the formal sciences being comprised of logic and mathematics and the factual sciences being comprised of natural sciences like physics and individual psychology and of cultural sciences like social psychology, economics, political science and history of ideas. Within the applied sciences knowledge from the basic sciences are used in research in order to achieve practical aims. Bunge also calls these sciences 'technology'. The main branches of applied science are according to him physical technologies, biological technologies (e.g. medicine), social technologies and thought technologies.

Bunge (1967, 24) himself does not seem to take a very dogmatic attitude to his own system of classification but rather invites the reader to rearrange and fill in gaps in the system. One solution that can be questioned is the placement of individual psychology among the natural sciences; this view ignores the way in which the human mind is intertwined in the surrounding culture. Human behaviour and the human mind are much too complicated to be seen only as natural phenomena. The view of medicine as biological technology is also too limited to account for medicine as a whole. It does not seem to cover e.g. social medicine, gene-

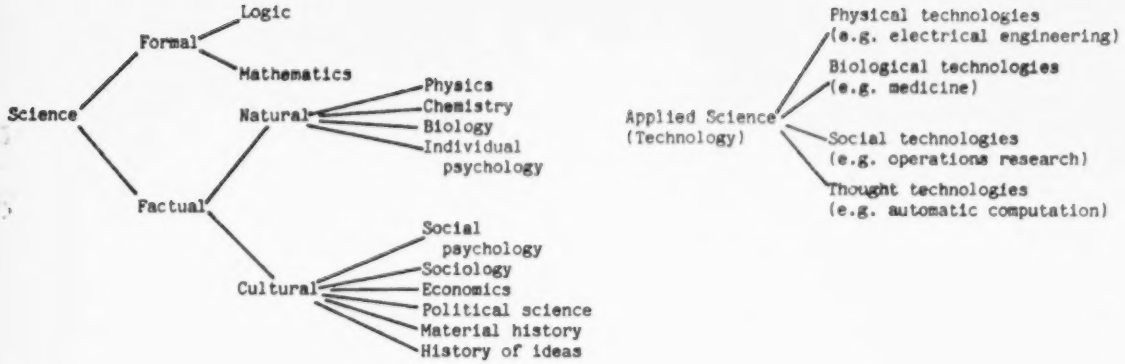


Figure 6.3 Classification of sciences according to Bunge (1967, 24, 26)

ral practice and psychiatry. And - as will be pointed out in this chapter - the classification of sciences only into basic and applied overlooks the characteristic nature of the sciences that will here be called practical.

While the distinction between basic and applied sciences in Bunge's model has to do with the aim of science, the basic sciences are usually classified on the basis of object of study; thus we can understand the distinction between natural sciences as studying different aspects of nature and cultural sciences as studying aspects of human culture. Pörn's (1985) suggestion that an autonomuous science should be defined on the basis of its own theoretical perspective, including assumptions about what entities the science concerned deals with (=ontological pre-suppositions) and what attributes these entities have (=categorial pre-suppositions), can probably be applied successfully as a principle for classifying basic sciences. This concerns primarily the so-called factual or empirical sciences, which are of the main interest here.

The distinction between natural sciences and cultural sciences seems to be general accepted in the literature, but the cultural or human sciences are often sub-divided into social sciences and humanistic sciences (see e.g. Nurmi 1981 and Sinkkonen & Hentinen 1983).

A division of the factual or empirical sciences into three categories is also found in Habermas' (1966 and 1975) and Jantsch's (1975) conceptions of science, although they use a different point of departure.

According to Habermas, whose theory was shortly presented previously in this study (p.35), the three knowledge interests work as points of departure for classification so that the technical interest dominates the natural sciences, while the practical-hermeneutic interest dominates the humanistic sciences and the emancipatory interest dominates

the critical social sciences. Habermas' classification system is usually presented in the form of a table (table 6.1)

MEDIUM	KNOWLEDGE INTEREST	TYPE OF KNOWLEDGE	RESEARCH
Work	Technical	Information	Naturalistic
Language	Hermeneutic	Interpretation	Historical-hermeneutic
Autonomy Power	Emancipatory	Criticism	Critical humanistic and social

Table 6.1 Habermas' classification of knowledge interests and science (Lesche 1971; Eskola 1975, 25; Lesche & Madsen 1976, 21; Lindholm 1979, 106)

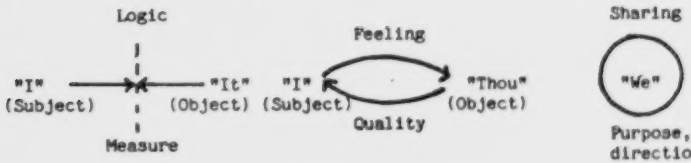
Erich Jantsch has developed another way of categorizing science that can be compared with Habermas' model. Jantsch starts out from a system theoretical frame of reference. Like Habermas Jantsch (1975, 81-100) classifies research into three categories. However, the starting point for Jantsch is not knowledge interests but the relationship between researcher and reality. He calls the three modes of perception and inquiry 'the rational approach', 'the mythological approach' and 'the evolutionary approach':

> "-The rational approach assumes separation between the observer and the observed, and focuses on an impersonal 'it' which is supposed to be assessed objectively and without involvement by an outside observer; the basic organizing principle here is logic, the results are expressed in quantitative or structural terms, and the dynamic aspects are perceived as change.
> -The mythological approach establishes a feedback link between the observer and the observed, and focuses on the relationship between a personal 'I' and a personal 'Thou'. Its basic organizing principle is feeling, the results are obtained

> in qualitative terms, and the dynamic aspects are perceived as process, or order of change.
> -The evolutionary approach establishes union between the observer and the observed and focuses on the 'we', on the identity of the forces acting in the observer and the observed world; the organizing principle is 'tuning-in' by virtue of this identity, and the results are expressed in terms of sharing in a universal order of process (namely, evolution)." (Jantsch 1975, 84)

The three approaches include, according to Jantsch (1975, 81-100) three types of knowledge: the rational approach gives us know-how or means-end knowledge, the mythological approach gives know-what and the evolutionary approach gives us know-where-to. The first approach and type of knowledge can be found in the natural sciences, says Jantsch, while the second approach and its corresponding type of knowledge can be found in art and the humanities. The third approach is more overreaching and is used e.g. in the planning of different systems like agriculture and community planning.

Jantsch (1975, 83) presents the three approaches in a figure to which can be added the relevant sciences (fig.6.4).



Rational approach	Mythological approach	Evolutionary approach
Know-how, means-end	Know-what	Know-where-to
Natural sciences	Arts and humanities	Social and other kinds of planning

Figure 6.4 Three basic forms of inquiry and their corresponding sciences (modification of Jantsch 1975, 83)

Although there are differences between Habermas' and Jantsch's categories, there are also similarities. Jantsch's rational approach, for instance, seems to have the same characteristics and include the same kind of knowledge as Habermas' information: it includes knowledge of invariances, laws and regularities that can be used in technical means-end calculations, thus also involving control over the processes concerned. The mythological approach, being qualitative, resembles the hermeneutical-interpretative research and they are both manifested in historical-hermeneutic and humanistic research. However, Jantsch seems to emphasize the role of feeling more than Habermas. Between the evolutionary approach and the critical-emancipatory research there is no direct parallel, since Habermas' and Jantsch's different frames of reference are most clear in the descriptions of these categories. Habermas' emancipatory interest and critical research reflects his view of society and its hidden laws, while Jantsch's evolutionary approach reflects the system theoretical frame of reference, involving a view of man and the world as a unitary whole. However, in one respect the evolutionary and emancipatory approaches can be said to resemble each other. Both represent an approach of a higher order than the other two; both represent a stage of research where knowledge serves the reflection upon the laws guiding social evolution and other kinds of evolutionary processes in order to re-direct and change the course of development. Referring to the task of scientific theory we might say that theories created through emancipatory and evolutionary research prescribe new patterns for the state of affairs rather than to organize data into existing patterns.

It must be kept in mind that neither Habermas' nor Jantsch's intention was to construct a system for classifying sciences in the way as e.g. Bunge did. Rather, they investigated types of research or research approaches on the basis of

knowledge interests and relationships between scientist and reality. Their conclusion is, however, that different interests and different relationships are characteristic of different categories of science. The connection between object of study (in Bunge's terms), knowledge interest and relationship need not be a necessary one. A researcher for instance, may approach the social world either rationally or evolutionarily and serve either a technical or an emanciparoty interest. According to Habermas (1966; 1974, 1-24), however, a purely technical social theory distorts man's understanding of himself. Jantsch (1975, 99) finally sees the three approaches as a hierarchy, where the evolutionary approach includes the mythological, which in turn includes the rational approach.

On the whole it seems possible to divide the factual or empirical sciences into three large groups which are not wholly separated from each other (fig.6.5).

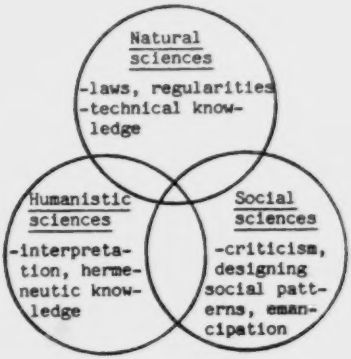


Figure 6.5 The three broad categories of basic, empirical sciences

This categorization corresponds to the generally accepted view of groups of sciences, where the humanistic and social sciences comprise what Bunge (fig.6.3) calls cultural sciences. Here they have been combined with Habermas' ideas of knowledge interests and Jantsch's ideas of modes of inquiry. The model in figure 6.5 indicates that there are overlapping areas, where the object of study may belong to two or more categories or where alternative interests and approaches are possible. Such overlappings are also indicated by Nurmi (1981), who, however, views the overlappings primarily as applied areas. The view of the basic sciences as overlapping allows for the possibility of defining a specific science in alternative ways. Psychology, for instance, seems to be a science that could be classified in different ways depending on what basic concepts are used to describe man and what scientific approach is taken.

6.2.1.2 Attempts to classify the sciences of education and health care

Attempts have been made to classify the different sciences of education and health care in one of the three main areas or to view them as applied areas that draw on several basic sciences.

In education, for instance, Wolfgang Brezinka represents a view that is close to Bunge's (1967, 26) suggested view of pedagogy as applied psychology. This view also holds a technical-rational view of education and its sciences. According to Brezinka (1976, 80-82, 106-111; 1977, 84, 95) the development of personality as well as learning follow certain laws. The task of educational research is then to describe these laws and to study how they can be applied in order to influnce the development of the students in a favourable way. Thus, education is described as an application of scientific laws, whereby the educator changes the state of the student's personality.

The technical-rational approach that Brezinka represents has usually been called 'the applied science approach'. This approach has been criticized for instance by Hunt (1977 and 1987, 9-36), Tom (1984, 135-140 and 1985), Carr (1986) and Carr and Kemmis (1986, 55-79). The core of the criticism says that education is too complicated to be viewed in this way, that educational interaction is not the same as a natural process and thereby cannot be described by a model that has been developed on the premisses of natural science.

A view of educational science as humanistic or cultural has been put forth by, among other, Wilenius (1976, 39-67 and 1979). He describes education in terms of Aristotle's and v.Wright's practical syllogism and theory of action, concluding that a humanistic, phenomenological approach is important in describing educational situations and educational acts. He does not, however, rule out positivistic research entirely. This approach emphasizes the role of the educator's consciousness in the educational process and thereby also the importance of studying consciousness. An empirical study representing this tradition is for instance Sirkka Hirsjärvi's study Aspects of Consciousness in Child Rearing (1981).

The humanistic science view has been stressed strongly in in many health care areas in recent years. This concerns especially the so-called nursing science and the more general science of care (see e.g. Sarvimäki & Stenbock-Hult 1986). This view is represented by, among others, Pörn (1982), Watson (1985), Dunlop (1986), Nordenfelt (1986) and Eriksson (1987a and 1987b).

Nordenfelt (1986) justifies his conception by saying that humanistic sciences study intentional human acts and their products, and since caring consists of such acts, it can be

considered a humanistic science. Eriksson (1987b) again founds her view of the science of care as a humanistic science on three premises: 1. The starting point of caring is the whole and living human being who experiences, desires and creates, and who consists of body, soul and spirit. 2. Health means being whole and experiencing oneself as whole with respect to body, soul and spirit. 3. Caring is a natural concretization of love and the core of caring is tending, playing and learning in a spirit of belief, hope and love.

Watson describes nursing science in the following way:

> "..., if we view nursing as a human science, we can combine and integrate the science with the beauty, art, ethics, and esthetics of the human-to-human care process in nursing. Human science is based upon an epistemology that can include metaphysics as well as esthetics, the humanities, art, and empirics.
> /.../
> As a human rather than a traditional science, nursing can view human life as a gift to be cherished - a process of wonder, awe, and mystery. Nurses can choose methods that allow for the subjective, inner world of personal meanings of the nurse and the other person. We can choose to study the inner world of experiences rather than outer world of observation." (Watson 1985, 17)

Watson's way of describing nursing and nursing science thus seems to correspond to Jantsch's mythological approach. What is more dubious, however, is that she seems to confuse nursing and nursing science - she talks of nursing as a human science, but nursing as such is not a science - and that she contrasts human science with traditional science. Human sciences, indeed, have their own traditions and can be very traditional in their own way. The point Watson (1985, 8-10) wants to make by this distinction is that she wants to separate nursing science from medicine by referring nursing science to the human sciences and medicine to the traditional sciences, by which she apparently means the natural sciences or positivistic science.

This attempt to classify nursing science and the science of care as humanistic and medicine as natural science is not unusual but none the less not necessarily justifiable. Bunge (1967, 26), for instance, conceives of medicine as biological technology and Pörn (1982) places medicine among the natural sciences while the science of care, according to him, is a cultural science. Eriksson (1987a, 72-79; 1987b) also makes a distinction between medicine and the science of care. She places the science of care among the humanistic sciences but does not explicitly put medicine in any specific category; the question is, whether or not the premises Eriksson puts forth as the premises of the science of care could be applied to medical care and medical science as well, in the same way as Watson's (1985, 10) human science perspective (emphasizing e.g. human as subject, science as a creative process of discovery, human as mind/body/spirit gestalt of whole being and reality as subjective as well as objective).

This implies that medical science can be as humanistic and holistic as nursing science and the science of care - which makes it even more difficult to make a clear distinction between these two sciences, because many advocates of nursing and caring science expressly want to found the distinction on the difference between nursing and caring science as humanistic and medicine as natural science. The view of medicine as holistic and humanistic does not seem to be foreign among the representatives of the medical discipline. Pellegrino and Thomasma (1981) as well as Fagerberg et al. (1984, 42-56, 242-243) can be seen as representatives of a humanistic medicine, focusing on man as a human subject, a unique person with freedom and responsibility, participating in the social community and capable of caring for others. Holistic and humanistic aspects of medicine have also been stressed by e.g. Rimpelä (1976), Aro (1978), Jääskeläinen (1983) and Sorri and Seppälä (1983).

Thus, it does not seem justified to draw the line between nursing or caring science and medical science along the line between humanistic and naturalistic science. If we are to talk of different sciences at all - a question that will not be solved here, because it demands a study of its own - these sciences are very closely related. Stoeckle (1987, 1) says, for instance: "Medicine's task is patient care". If this view is accepted, it would be consistent to also see medicine as a caring science, a view suggested e.g. by Kalkas (1987; see also Sarvimäki 1986

In addition to the natural science and humanistic science view, attempts have been made to place the sciences concerned among the social sciences. In the social science approach at least two different conceptions can be seen. One is the conception of these sciences as planning sciences, the other is the critical science view.

An advocate of the planning science view is Ilkka Niiniluoto (1984, 193-217). He views e.g. educational science and nursing science (hoitotiede) as planning sciences, which he sees as a special type of social science. The planning sciences differ from the ordinary social sciences with respect to their practical orientation. Their goal is not only to describe education and nursing but also to supply administrators with practical knowledge, by which he means knowledge that makes it easier for them to plan the practices of education and nursing. He also calls this a kind of "social engineering" approach. The practical knowledge supplied by these sciences, according to Niiniluoto, is organized into technical norms. Thus, they have the form: If you want to achieve A and think you are in situation B, you should (it would be rational for you to) do X. Niiniluoto offers the following example:

> If we want the citizens to have good language skills, instruction in the first foreign language should begin in second grade.

A technical norm is true if, in fact, doing X (beginning instruction in the first foreign language in second grade) leads to A (good language skills among the citizens). In addition to being true the technical norm, according to Niiniluoto, must also be relevant. This means that the goal specified in the norm must be such that it is accepted in society at that given time.

Niiniluoto's view of educational and nursing science seems very limited: to describe the practices and to establish technical norms. These tasks do not, for instance, allow for criticism of the goals. He says that the goals must be accepted by society - but what if the educators and nurses find the goals corrupt and detrimental? Whose task is it then to criticize the goals and whose task is it to judge the relevance of the norms? On the whole, Niiniluoto's view comes very close to the rational-technical approach, although he sees these sciences as social sciences. Viewed in the light of the praxis-techne distinction, Niiniluoto represents the techne-view, separating means and goals, facts and values, and eliminating the goal- and value-aspect from science. Technical norms of the type Niiniluoto mentions can be useful in certain strategic decisions but if education and health care are viewed as moral forms of life and as creative and communicative interaction, technical norms have a very limited function as organizers of theoretical and scientific knowledge. Niiniluoto's term 'planning sciences' indicates that there might be an evolutionary approach, in Jantsch's meaning, behind this view. Niiniluoto's point of departure is however quite different from Jantsch's. He does not emphasize the We-relation or question the purpose and direction, which is essential in the evolutionary approach. Rather, as a representative of a technical view, he takes the goal for granted or leaves it to the politicians, while science only deals with the means.

A social science view emphasizing the emancipatory interest can also be found in health care and education in addition to the technical-strategic conception. Hilpelä (1980) and Carr and Kemmis (1986) can be said to represent a critical science of education, while Hellström (1985a, 1985b and 1985c) has adopted an emancipatory approach to the study of general practice.

Carr and Kemmis (1986, 51-101, 155-178) analyze wgat they call the natural scientific and the interpretative view of educational theory and practice before they put forth their own critical view. The natural scientific view has much in common with the technical-rational view of the natural science and applied science approach as it has been presented in this study. The interpretative view largely corresponds to the humanistic-mythological approach. The main criticism of the natural scientific view focuses on the separation of means and ends, facts and values, which according to Carr and Kemmis is not appropriate in education. The main limitation of the interpretative view is in their opinion the exaggeration of the subjective aspects and isolation from the external social, economic and political forces. The critical science that they advocate builds directly on Habermas' critical social science. According to this view the role of theory is ultimately to organize action, and the suggest action research as the type of research that serves the emancipatory and critical interest.

According to the conceptions of the sciences of education and health care discussed here, the sciences concerned have been classified as either natural-technological, humanistic-hermeneutic or social-emancipatory (or strategic). The general classification of sciences into natural, humanistic and social constitutes the point of departure for this categorization of the sciences of interactice practices.

There is, however, one serious limitation in the whole endeavour of classifying sciences of interactive practices in this way. Some of the problems have been pointed out here, for instance the difficulty of separating different health care sciences from each other in this way. Carr's and Kemmis' (1986, 51-101) criticism of the natural science and the interpretative view of the science of education is also relevant for the health care sciences. But although this criticism is relevant, it does not necessarily follow that the social-emancipatory view as such is the solution. It certainly adds something to the scene which is missing in the other two approaches but this does not mean that the other two have nothing at all to offer - in this respect Wilenius (1976, 56-67) represents a balanced view.

The point is that these sciences should not be at all placed into any one of the three categories. A classification of the sciences of education and health care as either natural-technological, humanistic-hermeneutic or social-emancipatory (or strategic) necessarily leaves out two aspects while one is emphasized. The reason why this classification scheme is not suitable for the sciences studied here is that it divides reality into separate categories - natural and causal processes, subjective and intersubjective meaning, social and political forces - and investigates each one of these three categories of reality from its own theoretical perspective. As was pointed out previously (p.207), this may be a fruitfult approach in defining basic sciences. The interactive practices concerned here, however, involve all aspects of reality. They involve, for instance, instrumental interfering with objective, causal processes, strategic interventions, interpersonal communication and exchange of meaning, discoursive reflection and organization of social action. They involve acting in Umwelt and Eigenwelt as well as Mitwelt, World 1, World 2 and World 3. This concerns teaching as well as nursing, medical care and

other sub-practices in education and health care. And since the practices as such involve all aspects of reality, the sciences that investigate these practices cannot be defined on the basis of only one type of science, investigating only one specific aspect of reality.

6.2.1.3 The multi-scientific view

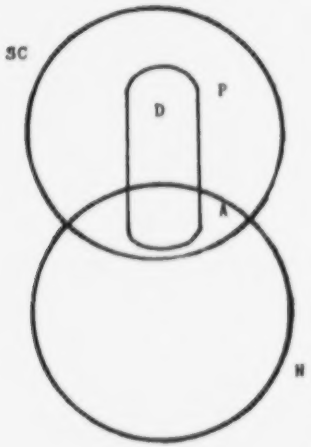
Since the practices of education and health care involve all aspects of reality, it is natural to assume that research into these practices must - in one way or another - combine several scientific areas. This does not exclude the possibility of creating theories specific for the practices concerned. This view is advanced e.g. by Nurmi (1981), who sees the science of education as a combination of humanistic and social science and medicine as a combination of all groups of empirical sciences, i.e. humanistic, social and natural. Sinkkonen and Hentinen (1983), using the same classification scheme as Nurmi, seem to place nursing science in the same category as medicine, although they remark that medicine involves a higher degree of natural sciences.

Håkan Törnebohm (1985) also dismisses the idea of research in practice areas representing only one scientific category. He says:

> "Why does praxis-oriented research tend to be multi-scientific?
> I think that the explanation is very simple. It is because of the departmentalization of the URA (=the Universal Research Area, my comment) as a consequence of the organization of the university. This departmentalization, fragmentalization of knowledge production, badly suits the knowledge need of practitioners in different developmental complexes." (Törnebohm 1985, 21) (My transl.)

Törnebohm (1985) calls all practices developmental complexes. A developmental complex is a combination of different elements: nature, artefacts, the socio-cultural

world and a private sphere. A developmental complex is thus a specific combination of different aspects of the world. (Fig.6.6)



P=private sphere
SC=the socio-cultural world
A=artefacts
N=nature
D=a developmental complex

Figure 6.6 A picture of the world, including a developmental complex (Törnebohm 1984 and 1985)

This picture of the world can be understood in terms of World 1, World 2 and World 3, or Umwelt, Eigenwelt and Mitwelt, as the terms have been used in this study. Thus, nature corresponds to World 1 or Umwelt, the socio-cultural world and the artefacts correspond to World 3 or Mitwelt and the private sphere corresponds to World 2 or Eigenwelt. If practices like education and health care then are conceived as developmental complexes, we can easily see, that also in Törnebohm's view these are made up of a combination of all elements of the world. This also means that while

the traditional basic sciences are classified on the basis of whether they investigate aspects of nature or aspects of the socio-cultural world, research in developmental complexes cannot follow this distinction. It must be multi-scientific.

Not only practices like education and nursing but also science, according to Törnebohm (1984 and 1985) is a developmental complex. Furthermore, he says that changes in one complex often induce changes in other complex. This is, for instance, how science causes changes in other complexes.

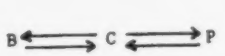
Törnebohm (1985) uses medicine as an example of a multi-scientific research area. In this area research is closely connected with health care practice, and because of this, research induces dramatical developmental effects. There is a considerable amount of border crossing between science and practice in medicine. According to Törnebohm this is due to the fact that clinical researchers have a practical paradigm as well as a research paradigm. The practitioners too have both a practical paradigm and a research paradigm. This makes it easier for the scientists to understand the problems that the practitioners struggle with and for the practitioners to understand and use research results.

A multi-scientific research area, according to Törnebohm (1985), consists of three elements:

> K, that stands for one or many compartments of the clinical research area,
> B, that stands for one or many compartments of basic science and
> P, that stands for one or many practice areas towards which the research area is oriented.

Törnebohm calls K, praxis-oriented and B, praxis-relevant. This means that the clinical research area is directed towards the immediate solving of practical problems, while

the basic research area is only indirectly related to praxis. There is thus an interaction between B, K and P so that B supplies K with useful knowledge and K supplies P with useful knowledge (fig.6.7).



B=basic sciences
C=clinical sciences
P=practice

Figure 6.7 Interaction between basic science, clinical research and practice (Törnebohm 1985, 22)

Although Törnebohm uses medicine as an example, he means that any multi-scientific praxis-oriented research area consists of the same elements and works in the same way. He also discusses the ideas in relation to educational research.

While knowledge, according to Törnebohm (1985) moves from B to C and then to P, we can assume that the arrow going in the opposite direction indicates that P supplies C with research problems, and that C in turn supplies B with problems. This is not quite explicit but at least suggested in Törnebohm's text.

Törnebohm (1985) very clearly states that research in a practice area must be of value for the practice concerned. The purpose of research is ultimately to supply the practitioners with new techniques and instruments, knowing how and knowing that. When the changes induced by research are progressive, development takes place in practice. For this to happen it is necessary, on the one hand, that the researchers are familiar with the practice area, and, on the other hand, that the practitioners have the ability to understand and apply research results. The double paradigms and border crossing within the discipline facilitate this, as Törnebohm points out.

Törnebohm's ideas are in many ways consistent with the view advanced in this study. Firstly, as a research area, a practice involves all aspects of the world in a specific combination, in the same way as Törnebohm's developmental complexes. Secondly, sciences investigating practices cannot be classified in the same way as basic sciences. And, thirdly, research in a practice area should be directly or indirectly relevant to the practice concerned.

However, there are also differences, which will be seen later, in the section on practical sciences. The point of departure for these differences is that Törnebohm after all uses the distinction basic sciences - applied sciences (i.e. clinical sciences) in his characterization of a practical research area. His view is not consistent with Bunge's (1967, 24, 26) according to which the research areas concerned here would be classified as entirely applied; after all, there is also, in Törnebohm's view, an area of basic practice-relevant research in e.g. education and health care sciences. But the whole idea of distinguishing between basic and applied science has its roots in the same rationale: there is one area of research that investigates the foundational laws and processes and another that investigates how these can be applied to reach practical goals, and, finally, there are the practitioners who apply this knowledge. Thus, although the practitioners have the task of finding relevant research problems, the "flow of knowledge" goes from basic science to applied science and from there to practice. This view then represents the approach criticized by e.g. Hunt (1977 and 1987, 2-3, 31-32), that is, the "outside-in" approach, according to which the theorists develop programmes for the practitioners to implement.

Some remarks must be made here. First of all, there are certainly sub-areas of research in a practice or developmental complex that can be conceived in this way. One such area is clinical medicine. It must be kept in mind that Törnebohm (1985) uses medicine as an example of how research

in a practice area works and it seems as if he has thought especially of clinical medicine - even his term 'clinical sciences' indicates this. But clinical medicine does not exhaust the whole logic of practical research and not even the whole logic of medical science. Evaluational research as well as research in primary health care, therapeutic interaction and social medicine is unlikely to follow this same model. Another point to be made here is that Hunt's (1977 and 1987, 2-3, 31-32) criticism is directed especially towards the use of the "outside-in" approach in human interaction and human affairs not towards the whole approach as such. Now, medical care is certainly human interaction and a form of human affairs even in a clinical context,but this does not rule out the possibility of using the "outside-in" or basic science - applied research - implementation in some aspects of this care. Thus we may conclude that all interactive practices, including medical care, are forms of human affairs to which the basic science - applied science - implementation model is not suitable in the sense that it would account for the whole research approach in these areas. In some aspects of this research, however, this approach may be fruitful.

The distinction between basic science and applied science, basic and applied research, or technology, has also been discussed by e.g. Pörn (1982 and 1984b) and Eriksson (1986) One theme in this discussion has been whether a science of care (vårdvetenskap) can include an area of basic research that is guided by a pure, intellectual and theoretical interest or whether this science must always have a practical aim. Pörn (1982 and 1984b) and Eriksson (1986, 38-44) seem to mean that an area of basic, intellectually oriented research is justified, while e.g. Törnebohm (1985), as was mentioned, says that basic research in practice areas must always be praxis-relevant and Nordenfelt (1986) emphasizes that the most important task for this science is to find those acts or interventions that lead to the best possible care. Törne-

bohm and Nordenfelt thus give the whole sciences in these areas a practical aim, irrespectively of whether we talk of basic research or clinical and applied research.

I think that this discussion about basic and applied research, basic and applied science, has caused much unnecessary confusion. First, we must bear in mind that there are actually two lines of thought involved in this discussion. On the one hand there is the distinction between basic and applied sciences in the sense that Bunge (1967, 24, 26), for instance, classifies sciences; according to this distinction sciences like educational and caring sciences have sometimes been placed among different basic sciences (see section 6.2.1.2) or they have been characterized as applied sciences or technologies that draw their basic knowledge from other disciplines (e.g. Phenix 1964, 318-320 and Bunge 1967, 24, 26). On the other hand there is the distinction between basic and applied research in a specific practice or developmental complex; this idea, put forth e.g. by Pörn (1982 and 1984) and Eriksson (1983) does not presuppose that the basic knowledge be derived from other sciences but allows for the possibility of both basic and applied research within the same model. However, the question remains whether this basic research should have a practical relevance or whether a purely intellectual interest is justified as in the basic sciences.

When I say that much of this confusion is unnecessary, my intention is to show that the notion of a practical science may overcome these difficulties.

6.2.2 Educational and health care sciences as practical sciences

So far the following attempts to classify sciences in interactive practices have been investigated:

1. The basic science approach, according to which the educational and health care sciences have been classified as natural, humanistic or social.
2. The applied science approach, according to which educational and health care sciences have been characterized mainly as technologies.
3. The multi-scientific approach involving basic praxis-relevant research in many basic areas and applied praxis-oriented research.

As was noted previously,the third approach is closer to the view advanced in this study than the other two. The main weakness of the first approach is that it does not take into account that the practices investigated combine various aspects of reality. The main weakness of the second approach is that it restricts knowledge use in action to technical application, thus revealing a technical view on the practices. While the third approach overcomes the limitations of the first approach,it does not entirely overcome the limitations of the second approach - it just widens the range of basic areas to be applied.

One intention of the practical science approach is to also overcome the limitations of the third approach. The main points of the notion of a practical science can be stated as follows.

- The object of study of a practical science is a practice; a practice again involves acting with respect to different aspects of reality.
- The main purpose of a practical science is to make the practice concerned intelligible and to guide practice.
- The primary practice and science are both practices and the relationship between primary practice and science can thus be conceived of as an interaction between two action systems.

6.2.2.1 Interactive practices as an object of science

The main points concerning interactive practices as an object of science have already been put forth in this text. These points will thus only be summarized here and organized in a synthesis.

The interactive practices of health care and education can be conceived as moral forms of life and moral practices. The purpose of these practices is to contribute to and manifest a life worth living. Education and health care involve all aspects of the world: the bio-physical aspects, the socio-cultural aspects and the subjective and private aspects. The sciences investigating these practices must accordingly take into account all aspects of reality.

As forms of practices,education and health care can be described in terms of action sequences. Action is carried out through interaction and co-action, involving instrumental, strategic, expressive, communicative and discoursive action. The instrumental and strategic aspects of educational and caring interaction may well be investigated through a rational approach and with a technical interest. Instrumental and strategic action involves intervening in natural and other kinds of processes in order to bring about an intended result, they represent a type of means-end or technical action. Research into aspects of educational and caring action may thus give theoretical knowledge of the processes involved and of what to do in order to achieve the desired results. The expressive and communicative aspects of interaction in education and health care involve the expression and transmission of meaning and experiences through symbols. Research into these aspects require a mythological and hermeneutical approach, aiming at interpretation and mutual understanding. Discoursive action can,in a simplified way, be said to reveal, criticize and break down "hidden laws" and to re-organize action. Thus conceived it involves an

evolutionary, developmental direction. The research approach serving this aspect of interaction is the critically and evolutionally oriented research approach, giving knowledge of "where to".

As was mentioned previously (p.211) Jantsch sees the three research approaches as organized into a hierachy where the evolutionary approach includes the mythological, which in turn includes the rational. Thus, when the research approaches are usually connected to three different and relatively separate groups of sciences and aspects of reality, as they are represented in figure 6.5, the research approaches constitute a hierarchy according to Jantsch. The hierarchical conception can be considered as especially suitable to account for how the approaches are organized with respect to scientific research in education and health care. In these practices all aspects of the world are organized into a developmental complex, which means that the research approaches can also be conceived of as an organized whole. If Jantsch's approaches are combined with Habermas' interests and types of research, as they were previously (p.210), the scientific approaches thus form a hierarchy referring to the different aspects of the reality of education and health care (fig.6.8).

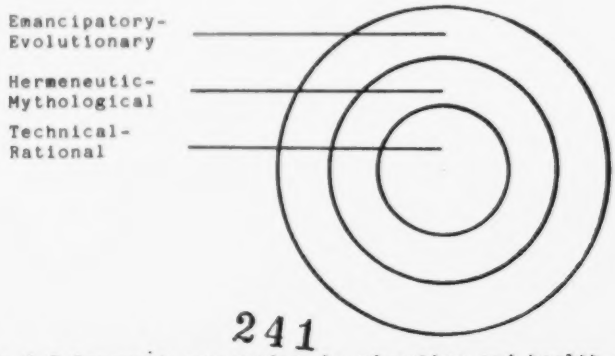


Figure 6.8 Research approaches in education and health care sciences (see also Sarvimäki 1986b, 191 and Sarvimäki & Stenbock-Hult 1986)

This hierarchy means that the largest and most overreaching aim of scientific research in education and the different sub-practices of health care is to develop these practices. This may involve searching for and determining goals, creating new working methods, developing organizations, criticizing and abolishing corrupt or outdated patterns of action etc. The hermeneutic approach is subordinate to the evolutionary and emancipatory. It guides research through which the meanings and experiences inherent in the practice as a whole and in interactive situations are interpreted. Hermeneutic understanding can be conceived as a prerequisite of evolution in practice. It may help the actors involved to orient towards the future. For instance, in education as well as in health care all acts can be conceived of as symbols of meaning. This is an implication of the conception of these practices as moral-communicative practices (pp.112-118; see also Sarvimäki 1986b, 140-144). Through the hermeneutic-mythological approach we can investigate the symbolic aspect of the practices concerned and thus receive knowledge that can be used to improve the practices as communicative situations. Educational and caring action also has an objective or objectifiable side, i.e. it involves processes that can be measured, quantified and predicted. However, since the practices have been characterized as moral-communicative, the objectified and technically approached processes are only part of a larger communicative context and thus subordinate to this context. For instance, objective disease symptoms are only one side of illness and can be viewed as symbols of an experiential state, communicating meaning. The research approach investigating the objective and objectified processes thus constitute one type of research, adding knowledge to a larger whole of scientific knowledge that ultimately is to be used to guide action.

Scientific research in the interactive practices studied here thus consists of combinations of approaches, investigating the different aspects of action and the world. How-

ever, although all three Worlds are involved in these practices, research need not be limited to the application of knowledge that has been acquired through investigating different areas of reality separately; this would correspond to the applied science approach. In other words, although the teaching-learning interaction, for instance, involves physiological and psychological as well as social processes, a teaching-learning theory need not be a straight application of knowledge that has been acquired from physiology, psychology and sociology as basic sciences. The teaching-learning interaction can be investigated as a unity of its own and described by concepts that are not mere applications of physiological, psychological or sociological concepts. This is what is meant by the notion of practical science. The practice concerned is treated as a distinct unity, an action system with its own task in society and with goals of its own. It can also be described with concepts of its own. For instance, teacher and student, teaching and studying, curriculum, instruction and school are examples of educational concepts. Similarly, health and illness, patient and care provider, nursing care and medical care are examples of concepts by means of which health care practice is described. Within the practices different areas of research and theory construction can be identified. A question that was slightly touched upon previously was whether it is possible or fruitful to try to distinguish between separate practical sciences within a larger practice, and, if such attempts are made, on what grounds this separation is to be made. This question, however, cannot be studied within the limits of this work.

Thus, one criterion of what is meant by a practical science is that its object of study is a practice that can be described by means of concepts of its own. In the case of educational and health care sciences the object is an interactive practice. A practical science, developing theories of its own, is then a larger notion than an applied science,

which derives its concepts, theories and knowledge from the basic sciences. A practical science can use applied knowledge e.g. in solving some technological problems and perhaps in solving other restricted problems. Applied research is then not necessarily excluded from a practical science but it does not exhaust the whole task of such a science.

6.2.2.2 The aims of a practical science

Another point to be made with respect to practical sciences is that the aim of these sciences is to guide practice. This view is consistent with Wilenius' (1976, 40-41) view of the nature of educational science. He claims that educational science should be practical in Aristotle's sense of the word. Wilenius puts forth the thesis that educational science should develop the consciousness of the educator and through this serve the development of the practice of education. However, he says, educational science seems to have become alienated from this aim. It has turned into a purely theoretical science, developing only the consciousness of the scientists themselves.

Thesis III in this study, which includes one of the main ideas argued for in this chapter, is consistent with Wilenius' view. Thesis III claims that the role of these sciences is to produce knowledge that can be used as an internal action determinant in practice.

It is important to note that guiding practice does not involve merely - and not even in the first place - giving prescriptions for the practitioners to follow. As Wilenius says in his thesis, it is through a development of the consciousness of the practitioners that guidance is to take place. If we accept this large view of what is involved in a practical aim, the conflict between theoretical and practical research turns into a pseudo-problem - that is,

if it has been conceived as a conflict and a problem to start with. This discussion was shortly introduced previously (pp.225-226).

Those writers who want to make a clear distinction between theoretical aims and practical aims often have a more limited view of what is to be considered as practical than what has been advanced in this study. When Pörn (1984b), for instance, claims that a science of care must be allowed a purely theoretical aim as well as a practical aim, he means by 'practical' the same as 'technological'. First of all, he sees caring as an activity governed by technical norms, i.e. norms that prescribe what measures to take in order to achieve certain goals. Thus, this view represents what has here been described as a technical view of this practice. A set of technical norms comprises, according to him, a programme for caring. The task of practice theories (vårdlära) would then be to codify and evaluate these programmes. The task of the science of care, again, according to Pörn, is explain and predict phenomena, that is, to construct descriptive theories. However, the purpose of these theories may be twofold, on the one hand to serve the practice theories, on the other hand just to serve a theoretical and intellectual interest. Pörn calls a science the ultimate aim of which is to serve practice a technological science. He accepts that the science of care may have such a purpose but he also claims that this cannot be the only aim, a purely theoretical aim, according to him, must also be allowed.

Now we can probably assume that this view of the relationship between practice, programmes, practice theory and descriptive or scientific theory also concerns other kinds of practices, like education. It can thus be generalized and visualized as a hierarchy of practice, programmes, and different types of theories (fig.6.9). A hierarchy resembling this one has been presented by Eriksson (1986, 38-44) mainly as an interpretation of Pörn's view as it was presented in

a previous article (Pörn 1982).

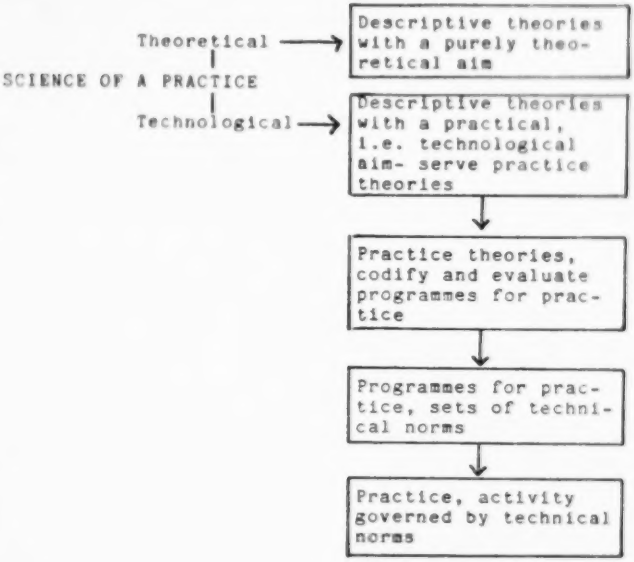

Theoretical
SCIENCE OF A PRACTICE
Technological
Descriptive theories with a purely theoretical aim
Descriptive theories with a practical, i.e. technological aim- serve practice theories
Practice theories, codify and evaluate programmes for practice
Programmes for practice, sets of technical norms
Practice, activity governed by technical norms

Figure 6.9 The relationship between practice, programmes and different types of theories (interpretation of Pörn 1982 and 1984)

This view of the relationship between theoretical and practical aims of a practical science can be compared with the views of Niiniluoto (1984), Tönebohm (1985) and Nordenfelt (1986) that have been commented on previously in this study.

Niiniluoto (1984), for instance, seems to make the same main distinction as Pörn. The planning sciences, as he calls them, have two aims: to describe the practice concerned and to formulate technical norms. He does not discuss whether the descriptive theories should only serve the formulation of technical norms or whether they may also serve a purely theoretical aim. At least he does not exclude this possibility.

Törnebohm (1985) and Nordenfelt (1986) again seem to be of a different opinion. As was pointed out in section 6.2.1.3, research in a practice area, according to Törnebohm, should be either praxis-relevant or praxis-oriented, praxis-relevant research corresponding to Pörn's descriptive theories with a technological aim and praxis-oriented research corresponding to Pörn's practice theories. Nordenfelt (1986) also advocates the view that the aim of a science of practice (in his case a science of care) is to help to find acts that realize the best possible practice. Thus, Törnebohm and Nordenfelt do not take into account descriptive theories with a purely theoretical aim.

According to the view advanced in this study the conflict between theoretical and practical aims in practical sciences, to a large extent, can be seen as a pseudo-problem that has arised out of too limited a view of how theory enters practice. According to Niiniluoto and Pörn scientific-theoretical knowledge is used in practice in the form of an application of technical norms. Törnebohm does not use the same terminology, but in his model too basic science enters practice through the mediation of clinical research. This is certainly one way in which theory is applied but not the only one. This again has to do with the complicated nature of educational and caring practice. The technical aspect is only one aspect.

In this study educational and health care practices have been described as moral forms of life, as communicative and creative interaction and co-action, as a process of "reading" and "flexing" that has an interpersonal as well as a socio-cultural level. In this process there are not necessarily any fixed goals or ready made programmes. And what the practitioner needs is not inte the first instance a set of technical norms to implement but a view of the practice that helps him to understand the situation he is involved in, that

helps him to see the relevance of his action in a socio-cultural context, that helps him to understand the other participants and himself and that helps him to plan and choose between different courses of action. To do all this the practitioner needs more than a set of technical norms, although this may also be useful. Since the practitioner is not primarily an applicator of technical norms but an actor reflecting-in-practice, he needs a theory that he can use as a means of reflection-in-action. Such a theory may well be a theory of the type that Pörn calls purely theoretical.

Thus, a practical aim is not the same as a technical aim. The technical aspect is part of the practical but it is not synonymous with it. Parts of the practical aim of research can be reached by so-called technological research but in a practical activity research with a purely theoretical aim, i.e. with the purpose of constructing descriptive theories, may also be practical. Actually, a practitioner can not do without this type of theories if he is to know what he is doing. Then there is no real conflict between theoretical and practical aims: a theory that is constructed with a theoretical aim may be very practical.

There are, then, different types of theories in a practice area and these theories are linked to practice in different ways.

6.2.2.3 Different types of theories in a practical science

The nature and role of theory has been discussed by several authors in the area of education. In the health care area theories have been discussed especially in the nursing discipline. The discussions have concerned, among other things, the relationship between theories in practice areas and theories in natural and other basic sciences,and it has also concerned the nature of practice theories.

According to D.J. O'Connor (1968, 75-76) the term 'theory' is used in four different ways:

1. as a body of related problems, e.g. theory of knowledge, value theory,
2. as an organized conceptual system without practical connections, e.g. class theory and theory of numbers in mathematics,
3. as a set of rules guiding practical activity, especially activities that are complicated and systematic,
4. as a set of confirmed hypotheses, e.g. theories in natural science.

Educational theories belong to group 3, according to O'Connor. The task of educational theories, he says, is to explain and justify the techniques that are used in education; the justifications must be drawn from basic sciences like psychology (O'Connor 1968, 5, 99; 1973).

On the whole O'Connor (1968, 99-103; 1973) sees the natural sciences as an ideal and in his opinion educational and other similar theories cannot claim to be real, scientific theories unless they reach this ideal:

> "We can summarize this discussion by saying that the word 'theory' as it is used in educational contexts is generally a courtesy title. It is justified only where we are applying well-established experimental findings in psychology or sociology to the practice of education. And even here we should be aware that the conjectural gap between our theories and the facts on which they rest is sufficiently wide to make our logical consciences uneasy. We can hope that the future development of the social sciences will narrow this gap and this hope gives an incentive for developing these sciences." (O'Connor 1968, 110)

O'Connor thus represents an applied science-conception of education and the theories he looks forward to are to be conceived as applications of mainly psychological and sociological theories. These again should be developed in the same direction as theories in the natural sciences. O'Connor's

view is thus similar to Brezinka's (1976, 82 and 1977, 84, 95) and also implies the same technical rationality as Brezinka advocates.

O'Connor's view has been criticized by, among others, Paul Hirst (1969 and 1973). According to Hirst, theories in natural sciences are no ideal for educational theories, because their role is not the same. The role of educational theories is to guide action; thus, they should be practical theories. However, if a theory is to guide educational practice, it cannot be a mere transformation of theories in natural sciences. It must also include e.g. moral and metaphysical elements. There are, according to Hirst, different kinds of practical theories depeneding on what kind of practice they are supposed to guide. Engineering, according to him, can rest on theories that are derived from the natural sciences but e.g. educational and medical theories cannot exclude the value and metaphysical elements.

The same type of discussion can be found among nursing theorists. Some of them view only decriptive theories as real, scientific theories and see the natural scientific theories as an ideal. Others again advocate practical theories as the type of theories that are needed in practical disciplines like nursing; the practical theories are usually considered as including elements other than the descriptive theories.

Lorraine Walker (1971) belongs to the first category of nursing theorists. She wants to reserve the term 'theory' for scientific, descriptive theories. 'Practical theory', according to her, is used to indicate practical principles or directives to which the term 'theory' is not suitable at all.

James Dickoff, Patricia James and Ernestine Wiedenbach, again, (Dickoff & James 1968; Dickoff & James & Wiedenbach 1968a

and 1968b) seem to mean that the aim of nursing research is to construct theories that can be used to guide nursing. They distinguish between four levels of theory: I. Factor-isolating theories, II. Factor-relating theories (situation depicting), III. Situation-relating theories (predictive and promoting or inhibiting), and IV. Situation-producing theories (prescriptive). The aim then is to reach level IV, to construct situation-producing theories that specify the goal for the activity, that formulate prescriptions for goal-attainment and that include a survey list of those aspects of the activity that are not formulated in the goal or the prescriptions but that none the less should be payed attention to (e.g. patient, framework, dynamics).

Naturally, much more than the books and articles presented here has been written on theories and theory construction in education and different health care disciplines. The theorists chosen here, however, are often referred to and well represent the main positions in the question of scientific and practical theories in practice disciplines.

We can see that mainly two pairs of terms are used to distinguish between the different types of theories. On the one hand distinction is made between scientific and practice or practical theories, on the other hand between descriptive and prescriptive theories. Since the terms 'descriptive' and 'prescriptive' tell what the theories are supposed to do, this distinction will be used as the main distinction here.

A descriptive theory is usually defined as a theory that explains reality and that also can be used to predict events. This type of theories also include theories that interpret data. (Pörn 1984 and 1985)

If the three research approaches are used as a point of

departure, three types of descriptive theories can be conceived of: 1. theories that include causal explanations and quantitative connections, 2. hermeneutic, interpretative theories that re-identify data (Pörn 1985) and 3. critical, emancipatory theories that criticize data. According to Pörn (1985), one type of description can be part of another type. Explanations in natural sciences, for instance, are mainly of the first type, but they include elements of the second type that helps re-identify data before the connections between them are sought. Theories in the humanistic sciences, again, are mainly of the second type but may include elements of the first type. According to the view of practical sciences that has been advocated in this study the three research approaches comprise a hierarchy involving all approaches (fig.6.8). This means that all three types of theories are needed in a practical science. Figure 6.8 indicates the main hierarchy of these theories, but it must also be kept in mind that one and the same theory may include elements from separate types in the way suggested by Pörn.

While the descriptive theories explain, interpret and criticize the world as it appears through a set of data, the prescriptive theories tell how things should be and what should be done in order to achieve and manifest what ought to be. These theories thus include elements like those suggested by Hirst (1969) and Dickoff and James (1968).

Descriptive theories have sometimes been compared with a map and prescriptive theories with a design or plan. This metaphor is used e.g. by Pörn (1988). This means, according to him, that we use different criteria in judging the correspondence between theory and reality. If the map does not correspond to reality, we conclude that there is something wrong with the map, i.e. with the theory. On the other hand, if we have a design or plan of how to build a house and the house we have built does not correspond to the design, we conclude that there is something wrong with the

house, i.e. with reality. Pörn also calls the descriptive theories 'theories of practice' and the prescriptive theories 'theories for practice' and concludes, as in his previous articles (Pörn 1982 and 1984), that both types of theories are justified in a practice discipline like nursing. The conclusion may also be made that by 'descriptive theories' Pörn means the same as 'scientific theories' and by 'prescriptive theories' the same as 'practical theories', in Walker's sense of the words, since he explicitly refers to Walker in the previous articles.

As was argued previously in this study (pp.235-236), the idea that these two types of theories are justified in a practice discipline is quite acceptable. What was criticized was rather the view that it is only the second type of theories that is used in practice and that the function of the first type - with respect to practice - is only to serve the second type. This conception expresses a very limited view of how practitioners work, for instance, within health care and education. If we want to use the map and plan metaphor, we can say that a practitioner needs not only a design or plan but also a map. This again has to do with the complicated nature of these practices. As creative processes - a view that has been advanced in this work - these practices do not involve only "making" according to a fixed design or recipe but "designing while making", to use Harrison's (1978, 13, 136-143) terms. This is also what is involved in the conception of these practices as praxis rather than techne. Since praxis does not separate means from ends and facts from values in the same way as techne, the praxis-view also has implications for what is to be conceived of as a practical theory.

Now we can return to the conception of a practical theory and to theses III and IV, namely that science in an interactive practice is a way of articulating and creating knowledge that can be used as an internal action determinant

and that the theories constructed in these sciences should be conceived of as practical irrespectively of whether their purpose is directly practical or theoretical.

6.2.2.4 Practical theories

One of the main ideas argued for in this work is that knowledge is an internal action determinant, since man, as a knowing being, is at the same time a living and acting being. The role of knowledge is to guide human living and acting. This also concerns scientific and other kinds of theoretical knowledge, since they are - as the term indicates - only special kinds of knowledge.

This becomes especially apparent in practices like education and different areas of health care, which are conceived of as forms of life and action systems. The role of theories in these practices can thus be said to guide practice. But, if they are to guide practice, they cannot include only technical norms and prescriptive programmes, since these are insufficient as guides of practice in these areas.

A practical theory, in the sense of a "guide", should include a range of various elements, of which the following ones are to be seen as examples:

- causal and other types of similar descriptions and explanations,
- descriptions and frameworks that can be used to re-identify data,
- descriptions and frameworks that can be used to criticize prevailing conditions in the practices,
- specifications of the goal or the goals that give direction to the practice,
- principles and prescriptions that are to be followed,
- values that are to be realized.

This list of examples indicates that a practical theory is not to be conceived of only as a set of technical norms. It may also include, as Hirst (1969) points out, moral and metaphysical elements. The need for ethical guidelines is indeed recognized by Pörn (1984) but he sees them as separate from the practice theory; Nordenfelt (1986) seems to be of the same opinion.

If practical theories are to include all - and maybe even more - elements mentioned,it is unlikely for one and the same theory to do everything that is expected of a practical theory. As e.g. Walker and Avant (1983, 4-9) point out,there are different levels of theory: meta-theory, grand theory, middle-range theory and practice theory. According to the conception of practical theory advocated in this work such a theory is not restricted to what Walker and Avant call practice theory (specification of a desired goal and a set of prescriptions for the achievement of the goal) but rather there may be different levels of practical theories. A practical theory on the meta or grand level is likely to also include metaphysical and explicit value elements. Walker's and Avant's practice theory corresponds more with e.g. Pörn's concept and involves what might be called, in the context of this study, an instrumental or strategic theory - which again can be seen as one type of practical theory, or as a practical theory on a specific level, but not as an exhaustion of the notion of a practical theory. Thus, within a practice discipline a wide range of practical theories are needed - stratetic and instrumental theories, ethical theories, critical theories etc. These can be combined in different ways.

Now we can also return to the figure representing the relationship between data, concepts and theory (fig.6.2, p. 200). A similar type of model can be used to describe how a practical theory with its different elements works (fig. 6.10).

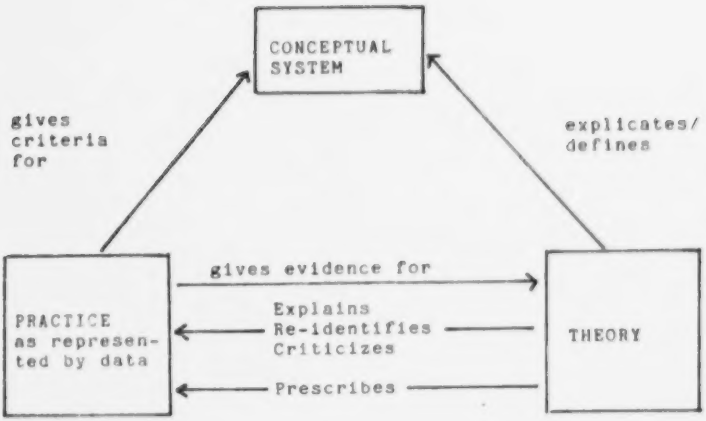


Figure 6.10 Connections between theory and practice

In figure 6.10 data represents a specific practice, e.g. education or health care; data is gathered from this specific practice. In the same way as in figure 6.2 data provides criteria for the concepts that are explicated and defined by the theory. The link between theory and practice is however slightly different. As in figure 6.2 the theory explains and re-identifies data but, since critical theory was added to the scientific approaches, theory can also be said to criticize practice as it is represented through available data. In addition to this, theory also prescribes practice. When theory is conceived of in this wide and differentiated way, data gives evidence for some elements of the theory but not for all. The critical and prescribing elements involve value judgments, which are not supported by data in the same way as the explaining and re-identifying elements. This again has to do with the nature of the map-elements as systems of actuality and the design- or plan-elements as systems of ideality (Pörn 1988).

The actuality and ideality aspect of a practical theory can be understood against the background of what a theory is supposed to do within the framework of a practice. If a theory is conceived of as an internal action determinant, e.g. as in figure 4.9 (p.153), the function of theory is on the one hand to interpret, explain and criticize data, that is, the acquired information. This involves the map elements of the theory, or the actuality system: the actor tries to achieve explain and interpret what is the case and understand data in a critical way. When the actor is involved in the planning and deciding phase again he utilizes the ideality system in designing what courses of action to implement. Thus, a theory that is to guide action - a practical theory - presupposes descriptions as well as prescriptions.

6.3 Science and practice

The role of science in a practice discipline is thus to create theories that can be used as guides in practice. This view corresponds to Wilenius' (1976, 39-41) conception of the science of education as a support system for the practice of education. Science in a practice discipline is thus simultaneously a science of and for practice. According to Nurmi (1981), all science is actually to be conceived of as a social institution that strives to guide practical activity.

The view of science in e.g. education and health care as action systems guiding the primary practices is presented in figure 3.1 (p.68). Science is here conceived of as a second order action system together with education and administration (see also Wilenius 1976, 39).

The view of practices of different orders within a practice discipline can be compared with the indivudual as compri-

sing action systems of different orders. This view has been elaborated e.g. by Frankfurt (1971) and Pörn (1981 and 1984b).

Man can be described as an agent or a subject, whose action runs through the same phases as all action systems. As a first order action system man acts in relation to the environment and other agents. However, due to his symbol-making capacity and consciousness, man is also a self-conscious and self-reflecting being. This means that man can acquire knowledge of himself and his action, and also, that he can control himself as an action system and develop himself. These processes can be conceived of as second order activities, since the object of the activities is man himself. Man's second order action systems can be said to have primarily three functions with respect to his first order action system: 1. an informing function, meaning that man can acquire self-knowledge and, consequently, take a reflective attitude towards himself, 2. a controlling function, meaning that man can develop self-control; he can, for instance, decide whether or not to act upon his first order will, 3. a developing function, meaning that man can consciously set out to change his first order action system. (See also Sarvimäki 1986b, 27-28, 167-168)

The second order systems of a practice can be said to perform the same tasks. They acquire information of the first order practice and investigate it critically. They control the primary practice and develop it. All three secondary practices perform all three tasks in their own way. The research system thus acquires information of the primary practice and investigates it critically. Research also controls primary practice and contributes to the development of the primary practice. Scientific research performs its tasks by creating theoretical knowledge that can be used as internal action determinants.

6.4 Theories in, of and for action

The relationship between science and practice can thus also be seen as a relationship between different types of theories in action and as a result of action.

As was pointed out previously, the descriptive theories have often been called theories *of* practice while the prescriptive theories have been called theories *for* practice (Pörn 1982 and 1984b). As I have argued in the previous section, a practical theory - i.e. a theory guiding practice - is a theory of as well as a theory for. If by a scientific theory is meant a theory that is a product of scientific activity, a practical theory may well be scientific: it can be a result of empirical as well as other types of investigations, e.g. ethical, conceptual, philosophical, etc. This view of what is meant by a scientific theory is then larger than e.g. Walker's (1971) and Brezinka's (1978, 38) views according to which only theories that have here been called 'theories of' can be called scientific. All practical theories are not scientific. They can also be a result of traditionally inherited conceptions and principles.

In addition to theories of and for practice theories *in* practice have been treated in this study. A theory in practice is one that is actually used in practice - either implicitly as embedded in action or explicitly as a means of reflective orientation. The possibility of the technical norms being implicit is also recognized by Pörn (1984), but according to the view advanced here all elements of a theory may be implicit. If a scientific theory is used in action, it becomes a theory-in-action.

The relationship and development of the different types of theory can be described as follows. The starting point of the interaction between the different types of theory starts

with practice. Practice is always a manifestation of an implicit theory but it is also always primary to the explicit theory. Entwistle (1976, 46) puts it in the following way:

> "For, logically, practice is prior to theory. It is not possible to formulate theoretical maxims pertinent to a skill aside from prior existence of the skill in fact or in imagination."

The implicit theory can be made explicit through everyday reflection on and articulation of experiences or a theory can be constructed through different kinds of scientific research. In this way we get theories of and for practice. These can be used in the practice as reflective orientation. By means of theory the actors explain, interpret and criticize their practice as well as formulate prescriptions to be implemented. (Fig.6.11)

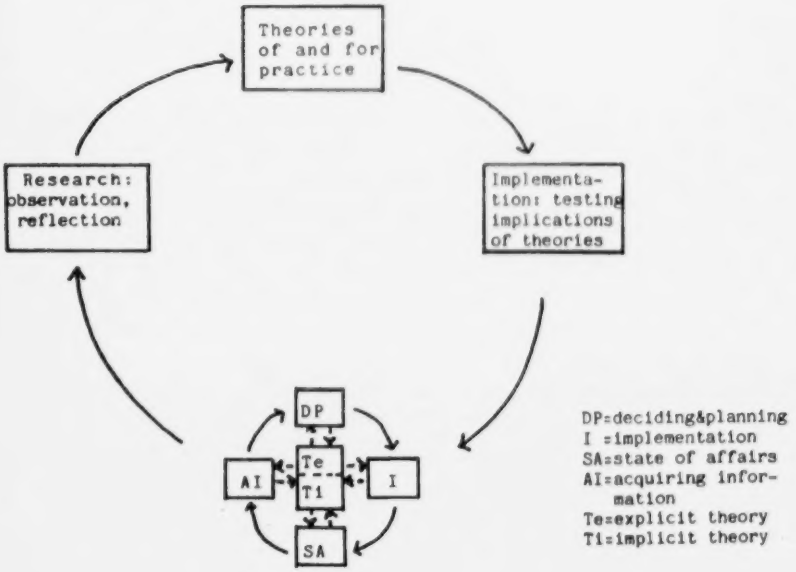


Figure 6.11 Theories in, of and for practice

In figure 6.11 the practical process, the scientific process and the learning process are united. The practical process, guided by implicit and explicit theories-in-action, constitutes the starting point of the developmental process. The phases in the research process correspond to the phases in the process of experiential learning as presented by Kolb (see p.175). The relationship between practice and research can thus be conceived as a process of learning, where the use of new theories-in-action can help the practitioners to guide their action in new ways. Practice and research thus constitute a common action system, where a close interaction between the various action systems can promote a common developmental process.

7. DISCUSSION AND CONCLUSIONS

This study started out with the classical definition of knowledge as a well justified true belief and with Anscombe's remark that this view of knowledge has been dominating epistemology, setting, for instance, the whole question of practical knowledge aside. By investigating knowledge in interactive practice disciplines, like education and health care, I have wanted to widen the conception of knowledge in these disciplines as well as generally.

The rationale underlying the study follows the aims and theses, which correspond to each other. I shall use these aims and theses in structuring the discussion.

Aim 1. To formulate a view of the role of knowledge in an interactive practice.
Thesis I. The role of knowledge in an interactive practice is to guide practice.

This thesis was founded on the pragmatistic epistemology of e.g. Dewey and Lewis. The fact that it is given this pragmatistic background ultimately means that this conception of the role of knowledge is not restricted to interactive or other kinds of practice. Ultimately it means that the role of knowledge in general is to guide action. It must be emphasized, however, that this interpretation of pragmatism does not necessarily mean the same as useful, in the sense that the only role of knowledge is to supply the means for achieving certain ends. Rather, it means that there is a constant interplay between knowledge, action and values and that knowledge which is supposed to guide action must guide not only towards the achievement of certain ends but also towards a wider orientation in reality, to the setting of goals, to evaluation of action and so on. When an actor acts appropriately he is said to have practical knowledge.

Aim 2. To investigate and clarify different types of knowledge in an interactive practice.
Thesis II. The different types of knowledge in an interactive practice consist of value-knowledge, factual knowledge and procedural knowledge; some knowledge is unarticulated, some articulated.

In the context of an interactive practice like education and health care, value-knowledge stands primarily for moral knowledge, since the practices concerned are characterized as moral forms of life. Factual knowledge is interpreted in a way that may be larger than the usual conceptions of factual knowledge. Here factual knowledge refers to systems of belief that are constructed through empirical, rational and metaphorical processing of information. Procedural knowledge refers to the mastery of abilities and skills. These types of knowledge can be manifested in action and they can be articulated in everyday language, in art and in scientific theories. When these types of knowledge are manifested in action they guide the acquiring of information and planning and deciding as well as implementation and evaluation. Practical knowledge is a manifestation of all three types of knowledge.

Aim 3. To investigate and formulate a conception of science in an interactive practice discipline.
Thesis III. Science is a way of articulating and creating new knowledge that can be used as an internal action determinant in the practice concerned.

Science in an interactive practice discipline is a science of interactive practice as well as a science for interactive practice. It is a practical science in the old Aristotelian sense. Sciences of interactive practices are difficult to classify in the same way as basic sciences, since the object of these sciences involves all aspects of reality. Thus, these sciences must combine various approaches and theore-

tical perspectives. The role of these sciences is to help the practitioners explain, interpret and critically understand their practice and to help them acquire information, plan and decide action as well as implement and evaluate action. The practical role of these practices is also formulated in the conception of the sciences as auxiliary or support systems for the primary practice.

Aim 4. To clarify the concept of theory in an interactive practice discipline and to investigate different types of theories.
Thesis IV. The theories of an interactive practice can have both a theoretical and a directly practical purpose but the theoretical purpose is also indirectly linked to the practical.

Since the role of knowledge, according to the view presented in this work, is to guide action directly or indirectly, this is also the role of knowledge organized into theories. In this respect there is no actual conflict between so-called descriptive and prescriptive theories. The view that only prescriptive theories are practical, i.e. used as guides in practice, reveals a limited conception of how practitioners work. The theory that is manifested and applied in action cannot be merely a set of technical norms. A practitioner also needs a view of the situation and the context in which he works, he needs to understand himself as well as the other participants, that is, he needs a descriptive theory. According to this view of how a practitioner works,he is seen as a reflective and creative being who uses theory as a means of reflective orientation. In a practice discipline three types of theories can be seen: theories of practice, theories for practice and theories in practice. They all have their distinctive roles and features. The relationship between research and practice can ultimately be seen as a process of common learning and development.

As a general conclusion of the investigation made, we can put forth that the classical and largely accepted definition of knowledge as well justified true beliefs is too limited to account for all kinds of knowledge. By the study of knowledge in interactive practices I have wanted to point out that in these practices true beliefs are only one type of knowledge. Since this is so in the interactive practices it must also be so generally. Many of the scientists referred to in this work have indeed realized this and suggested other kinds of knowledge like personal knowledge, esthetic knowledge, moral knowledge, practical knowledge, procedural knowledge and familiarity. By studying these kinds of knowledge in the context of an action system, I have tried to achieve some kind of coherence and systematization of these types of knowledge. The different types of knowledge have thus been understood as parts of different internal action determinants.

Since the definition of knowledge as well justified true beliefs is too narrow and refers to only one type of knowledge we need a larger definition that covers all types. The definition I want to suggest is: Knowledge is correct information. This definition is not to be considered as new and original in the sense that it is the conclusion of this sole study. Rather, it is the view of knowledge that seems to be either implicitly or explicitly accepted in the so-called cognitive psychology and pedagogy and information theory. In his book Knowledge and the Flow of Information Fred Dretske (1981, 85-105), for instance, criticizes the classical definition of knowledge and also suggests a view of knowledge that puts knowledge in an information theoretical perspective. This view of knowledge can then also be seen as corresponding to the view dominating many of the studies used here, although they do not always explicitly define knowledge (see e.g. Leino 1987, Leino & Leino 1982, Neisser 1982, Rancourt 1983 and Royce & Powell 1983).

If tne definition of knowledge as correct information is accepted, it is also important to adopt a large view of man as an acting and information-processing being. What I mean is that if information is conceived of as only being organized into systems of beliefs this definition offers no improvement. However, according to the view advanced by Royce and Powell and carried on by e.g. Rancourt and Leino, man is, in an very large sense, conceived of as an acting and information-processing being, where information is processed not only by so-called cognitive or intellectual systems but also by affective systems, value systems and psycho-motor systems.

As a processor of information man is also an actor, not just a speculative observer. This leads us back to the epistemological points of departure in this study. Information processing is part of an action system: action constitutes the a priori of information-processing and action is also influenced by the information processing activity and by the product of this activity, that is, information organized in different sub-systems.

The internal action determinants can thus be conceived of as systems organizing information in different ways. Information is organized into procedures, beliefs and value systems. Information is also organized into action schemata and theories-in-action. Further, information can be articulated and inarticulated and it can be organized in traditions, habits, principles and scientific theories. In short, information can be organized in all the ways that have been treated in this study. The view of knowledge as correct information thus seems to better suit the conception advocated in this study than the classical definition. Well justified true beliefs are only one type of system organizing information.

However, according to the definition now accepted,

information must also be correct.
This does not change the position or present any obstacles that cannot be overcome. Throughout the treatment of the different types of knowledge different truth criteria have also been discussed and these criteria, mutatis mutandis, can be seen as criteria of correctness of information.

The conception of knowledge thus accepted can be applied both to man as an acting processor of information and to information as it is processed within an interactive practice discipline. In both cases information is seen as part of an action system, on the one hand being influenced by that action system, on the other hand influencing it. Considering interactive practices like education and different sub-practices of health care, we may thus conclude that all types of knowledge are also needed within this kind of action system. In the Introduction to this work I remarked that some scientists and writers in these disciplines put high hopes on the role of science and theory in these areas while others question their importance. According to the conception put forth here, scientific knowledge may have an important but still limited function. Knowledge organized in scientific theories can help the practitioner in his reflective orientation and serve him in his search for relevant means, but this knowledge can never rule out the importance of the other types of knowledge. Interactive practices are very complex and pre-suppose the processing of information at different levels and in different ways at the same time. All information involved for instance in an interactive situation can never be entirely coded and articulated in explicit theories. The doctor, the nurse or the teacher must always be prepared to act spontaneously, to perceive the unique features of each situations, to react on the feelings and sudden expressions of the others and to observe his or her own reactions.

The reason why scientific knowledge and research seem to

have difficulties in reaching teaching and the nursing practice may be due to the irrelevance of the theories produced. They do not help the practitioners to understand the work they are doing and they cannot be used to formulate goals or find means. This possibility was commented on previously. In this respect I do not think that qualitative and phenomenological research is the solution - which some nursing researchers seem to claim. They may be right in their critique of previous nursing research as being too positivistic but the problem is not solved by going from one extreme to the other. As I have tried to show here, the interactive practices involve all aspects of reality and thus they must also be investigated with different approaches. One type of research is not sufficient to account for the practice as a whole.

Another reason why scientific knowledge does not seem to be significant for practitioners in education and nursing, however, may also be due to the vast variety of knowledge involved in these practices as a whole. A person may well be able to teach if he has the necessary procedural knowledge, the relevant values and a functioning implicit theory, even if he possesses no scientific knowledge of teaching. As long as everything goes well he may not feel any need of scientific knowledge. Scientific knowledge may increase his awareness of what he is doing - if the scientific theories are relevant - but all teachers do not necessarily see the importance of this. In this respect medical practice probably differs from teaching. Although medicine as a whole need not be classified as a natural science, many aspects of medical practice pre-suppose knowledge of natural processes and technical-instrumental knowledge on a scientific basis. This has led to a closer relationship between practice and research in medicine than in e.g. education.

If scientific knowledge is to be relevant in e.g. teaching and nursing it must have something to offer the practitio-

ners. This again presupposes a closer relationship between practice and research than there seems to be now.

This study of knowledge in interactive practice disciplines has been focusing on knowledge in the primary practices and in research practice. Education and administration as secondary or auxiliary practices have been left outside the study in order not to split the investigation over too wide an area. The connections between these practices and the primary practice requires a study of its own - or two separate studies. However, one consequence of this investigation for may be pointed out: since an interactive practice involves a wide variety of knowledge, this variety must be considered in the education of practitioners. Scientific and other kinds of theoretical knowledge is not enough. A practitioner who is going to be involved in human affairs like teaching and providing health care of different types also needs personal-moral knowledge, technical and other kinds of skills and abilities, familiarity with a wide range of situations etc. Moral education, practising skills and getting acquainted with the practical contexts should then be important features in all education of this type of practitioners. Education should also involve knowledge on the socio-cultural level, i.e. knowledge that helps the practitioner to understand the world in which he practices.

In this study I have mostly referred to interactive practices generally, indicating that the line of argumentation and the conceptions presented concern all types of interactive practices. On the other hand, the literature and the examples used are mainly taken from education and health care. Health care again has been represented primarily by nursing and to a smaller extent also by medicine. The reasons for this choice were presented in chapter 3, and to these may be added that teaching and nursing have been chosen because they are practices that I have been involved in myself,

in research and practice as well as in education. My knowledge of medicine is much more limited, confined to the elements of medicine that are involved in nursing and to literature and discussions on the subject.

The research area thus chosen is in one respect very wide. The practices and sub-practices differ from each other in ways that have not been taken into consideration. In teaching, for instance, much attention has not been payed to the role of the subject taught - except for indirect references in the discussion of disciplines and knowledge accessing modes. Health care is also a very wide area, including different types of sub-practices and tasks that have not been analyzed separately. On the other hand there are also interactive practices that have not been included in this study, social work and different types of service for instance. However, since I have concentrated my analysis on quite general features of interactive practices, practice in general, theoretical and practical knowledge, the nature of practical sciences and different types of theories, much of the argumentation should be applicable to all kinds of interactive practice disciplines - and to some extent to practice disciplines in general.

Since the area investigated is quite large, all problems have not been analyzed in detail. The nature of practical sciences and practical theories, for instance, requires further analysis. However, my intention has primarily been to study the main types of knowledge and to formulate a frame of reference and some epistemological starting points for the study of knowledge in interactive practice disciplines. This study can then be followed up by other studies, for instance:

- studies of education and administration as parts of interactive disciplines,
- detailed analyses of practical sciences and practical theories,

- empirical studies of how different types of practitioners actually use knowledge,
- empirical studies of how to integrate theory and practice in research, practice and education.

An investigation of these and other related problems could give us a better understanding of knowledge in general and of knowledge as it is utilized in practice disciplines. This understanding again might help us to direct education and research in practice areas so that they can guide practice and be practical in the widest sense of the word.

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ISBN 951-45-4787-X
ISSN 0359-5749
VAPK Kampin VALTIMO
Helsinki 1988

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